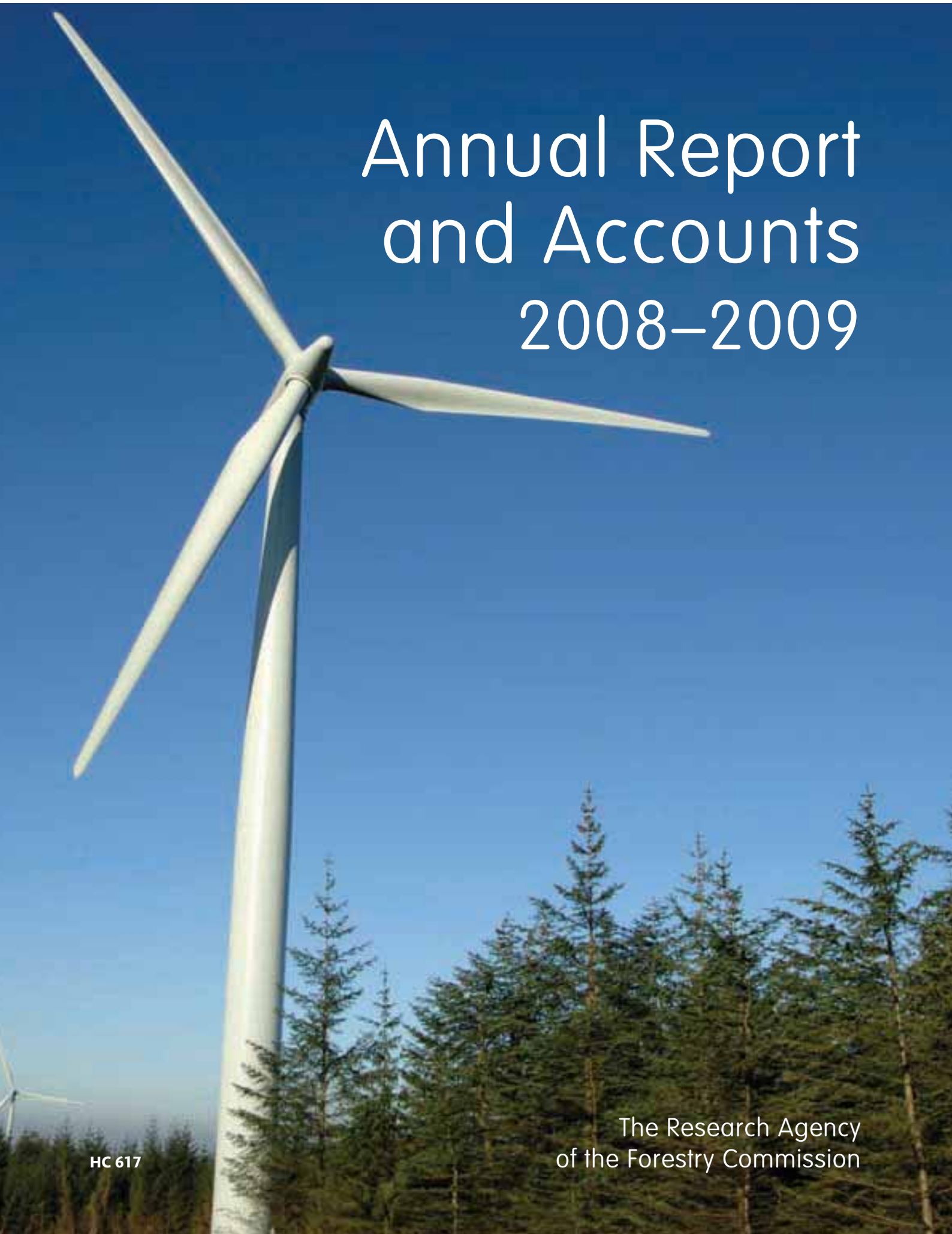
Forest Research



Annual Report and Accounts 2008–2009

The Research Agency of the Forestry Commission

HC 617

Forest Research
Annual Report and Accounts 2008–2009

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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Forest Research
The Research Agency of the Forestry Commission

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Cover image: Wind turbines in a coniferous woodland at Whitelee, East Renfrewshire. Forest Research has developed models, in collaboration with the University of Aberdeen, to calculate the impact of construction, soil disturbance, forest cover and turbine efficiency on the overall carbon balance of wind farms sited in forests.

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Chief Executive's Introduction

I was appointed as Forest Research's Chief Executive in June 2008 and am very pleased to be introducing the Agency's Annual Report for the first time. This report focuses on activities in 2008–09, presents delivery against our key performance indicators (KPIs) and details our accounts for the year ending 31 March 2009. It also takes the opportunity to consider the future.

Firstly, I would like to thank my predecessor Professor Peter Freer-Smith, our Research Director, for his hard work in leading the Agency during his tenure as Acting Chief Executive and for helping to lay some of the foundations for the current changes to the organisation. Secondly, I would like to highlight the context in which Forest Research (FR) works. FR is the Forestry Commission's research agency. The Forestry Commission's mission is to protect and expand Britain's forests and woodlands and increase their value to society and the environment. The Forestry Commission is our main customer and FR supports the achievement of its objectives by providing the high-quality research and development needed to underpin delivery.

In the pages that follow, each of FR's five research divisions presents an overview of its achievements over the past year, highlighting just some of the wide-ranging work that FR staff are involved in – from understanding forest and soil carbon balances to providing scientific support for the bioenergy and onshore wind industries. A vital part of this work is our strong emphasis on publishing our research for a range of audiences – the publications chapter (page 20) gives more details of our peer-reviewed papers and publications. The majority of our work is produced in partnership with others and this is reflected in the number and diversity of FR's research programmes and contracts (see page 28).

On behalf of all FR staff, I would like to express our gratitude for the ongoing support and co-operation of our partners and collaborators both in the UK and further afield. These include the Forestry Commission, central government, the devolved administrations in Wales, Scotland and Northern Ireland, the wider public sector, universities, research institutes, the private sector and the Commission of the European Communities. We greatly value the support and positive interactions that we have with all of our stakeholders and look forward to continuing to work with them in the future.

In particular, I would like to express our sincere thanks to the members of our **Advisory Committee on Forestry Research** and the external Visiting Groups it appoints to

provide independent assessment of the quality, balance and direction of FR's research programmes. I would also like to thank the members of **FR's Audit and Risk Committee** for their work in advising on financial management, risk control and governance in FR, and the members of our **IP Committee** for their support and sage advice on protecting and commercialising our knowledge.

Of FR's eight KPIs for 2008–09, seven have been fully met and one, relating to external funding, has been partially met. Full details of our progress against the KPIs are shown in the table on page 7. FR's 2008–09 target for non-FR income was not met. This is a reflection of many factors – an increasingly competitive and busy research marketplace; a trend towards shorter-term commissioned projects compared with longer-term research and, towards the end of the year, the effects of the global recession that reduced the research budgets of many customers. However, we fully appreciate that FR's ability to secure external funding and attract successful partnerships is essential for its continued survival and we will therefore continue to focus on attracting external funds and developing relationships that facilitate this.

During the year we have reflected upon and refined our vision for the future, which is for FR **to be a robust, market-relevant and flexible organisation with a reputation for innovative applied science.**

To help achieve this vision, FR has undergone a series of changes. Hugh Evans, an internationally recognised expert on biosecurity issues and former Head of FR's Plant Health Division, has transferred to Aberystwyth with a remit to **expand FR's presence and operations in Wales**. Two further appointments have subsequently supplemented Hugh's presence. This is designed to increase the prominence and presence of forestry research in Wales in order to underpin the Welsh Government's ambitions for the sector.

Given the disappointing financial outturn in 2007–08, we carried out an organisation-wide **efficiency and delivery review** in 2008–09. This highlighted a number of areas in which FR could make some cost savings and improvements in efficiency, including the need to restructure and reprofile its scientific expertise to reflect changing market demands.

Based on the recommendations from this review, FR secured support to offer a voluntary severance scheme to staff in order to enable this change. With the help of FR's trade unions we successfully ran a voluntary early severance scheme and agreed terms with 16 applicants at a total cost of £1.2 million. While this reduction in staff numbers will result in considerable annual salary savings, more importantly it will allow us to recruit new staff in areas where there is growing demand, for example in climate change, renewable energy, urban greening and social science.

Another aspect of improving our future business efficiency has been the implementation during the year of an agency-wide electronic time recording system. As with most software developments, this implementation has not been without teething troubles, but we are now confident that it will serve our needs for the future. The information from this new system will also underpin our shift towards a more collaborative and inter-disciplinary approach.

While reviewing our business efficiency, we also **reassessed FR's structure** to determine whether it was fit for purpose and 'future proof'. In particular, we looked at whether our existing operational structure was relevant to the UK Government's increasing interest in researching the need to adapt to and mitigate climate change. As a result we decided to disband our five science divisions to create three interlinking centres:

- **The Centre for Forestry and Climate Change**
- **The Centre for Forest Resources and Management**
- **The Centre for Human and Ecological Sciences**

At the same time, we have created an **Operations Unit** to improve our corporate and administrative functions such as HR, finance, communications and business development.

This new structure was officially launched on 2 April 2009, with all staff transferred to one of these three centres or the Operations Unit. As well as addressing market needs, this transformation into three centres is designed to remove internal barriers to co-operation and to encourage staff to work in multi-disciplinary teams to meet the rapidly changing and challenging research requirements of their clients from the public and private-sectors.

Clearly, this has been a year of significant change for Forest Research and one involving considerable consultation with and input from our staff. While all change is unsettling, FR staff have shown themselves to be both constructive and positive in moving forward and I would like to offer them my personal thanks for their continued support and engagement with this process. The rationale for these changes is clear: Forest Research is – and seeks to enhance its national and international standing as – a robust, market-relevant and flexible organisation with a reputation for innovative applied science.

As this report shows, these are exciting times at Forest Research and I look forward to a very busy and productive year ahead.

Dr James Pendlebury
Chief Executive

FR Corporate Plan Key Performance Indicators – Progress Report

Key Performance Indicator (KPI)	Commentary
1. During 2008–09 FR will increase its presence in Wales by locating staff in Aberystwyth. By June 2008 we will have appointed a Head of the FR Research Unit, Wales.	Hugh Evans started his new role in Wales on 5 January 2009 and is currently working out of the FC Wales Head Office in Aberystwyth. He has received much support and help from FC Wales and is preparing a business strategy and plan for our future operations in Wales.
2. In 2008–09, FR will increase its non-FC income to £2.4 million.	FR's non-FC income for 2008–09 was £1.9 million.
3. FR will establish a Climate Change Research Hub and an Urban Regeneration Greenspace Centre.	On 16 September FR announced its intention to disband its current divisional structure and its associated internal market and create instead three linked centres: the Centre for Forestry and Climate Change, the Centre for Forest Resources and Management and the Centre for Human and Ecological Sciences. The centres were launched on 2 April 2009 with all staff having been transferred to a centre or the newly created Operations Unit. FR has now established an Urban Regeneration and Greenspace Partnership, which was launched at the ParkCity Conference in London on 25 March 2009.
4. The work of Ecology Division will be reviewed by an external Visiting Group, which will report to the Advisory Committee on Forestry Research in November 2008.	The Visiting Group to Ecology Division visited Alice Holt and the Northern Research Station (NRS) in September 2008. The group was chaired by Keith Kirby (Natural England), with Gary Fry (Head of Research, Department of Landscape Architecture and Spatial Planning, Norwegian University of Life Sciences) and Des Thompson (SNH) as members. The Visiting Group issued its largely supportive report to the Advisory Committee on Forestry Research on 12 November 2008.
5. To improve customer satisfaction we will extend FR's Quality Assurance (QA) scheme to cover customer care, advisory services and the delivery of final outputs.	FR has completed a Customer Satisfaction Evaluation Report for 2008 and has prepared a draft QA system for customer care.
6. Building on last year's skills audit, staff training will be provided in business skills and management of IP, GIS and Equality and Diversity during 2008–09.	FR trained 36 staff in PRINCE 2 project management. Innovation and IP management training events and 'Who We Are' workshops have been held at Alice Holt and NRS. Level 3 Diversity Training has been completed. FR has nominated staff to participate in the Management Development Programme Tactical (MDP) Level 2.
7. To improve transparency and efficiency, FR will implement the recommendations of the 2007 Review of Finance and Project Management during 2008–09.	A new time-recording system and associated reporting has been introduced and is now up and running. It is hoped that this system will suit our needs for the next financial year and the transition to a matrix management structure. Closer monitoring of non-FC income and the ongoing cash position are also being introduced. These measures will improve transparency and efficiency.
8. FR will participate fully in the FC GreenerWays Programme.	FR is actively involved in the FC-wide GreenerWays programme and has committees at Alice Holt and NRS that have been proactive in developing recycling initiatives, raising energy awareness and recording baseline data.

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: to lead the development and promotion of sustainable forest management and to support its achievement internationally.

FR's Vision

To be a robust, market-relevant and flexible research organisation with a reputation for innovative applied science.

FR's Aim

To support and enhance the role of trees, woodlands and forests in sustainable development, by providing high-quality research, development and knowledge transfer.

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 the forestry policies of the UK government and the devolved administrations of Scotland, Wales and Northern Ireland. In addition, FC England, Scotland and Wales purchase research, development and surveys specifically related to their respective forest estates. 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 partnership working.

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 the consideration of social and economic issues. The Agency also carries out work on genetic conservation, tree improvement, seed testing, method studies, product evaluation, crop inventory, surveys and monitoring.

Resources

FR currently employs 260 (full-time equivalent) staff at Alice Holt Lodge in Hampshire, the Northern Research Station near Edinburgh, the FC Wales National Office in Aberystwyth and at field stations across England, Scotland and Wales. Contact information is given on the back cover. FR has published a Corporate Plan for the period 2009–2012 and copies are available to download from **www.forestresearch.gov.uk/corporateplans**

Advisory Committee on Forestry Research

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

Secretary
PROFESSOR P. H. FREER-SMITH
Research Director
Forest Research

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PROFESSOR D. EVANS
Consultant in the field of novel crop management solutions
Farnham, Surrey

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Chief Executive, Forest Research (from June 2008)

DR C. CAHALAN
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PROFESSOR R. CLIFT, CBE
Professor of Environmental Technology, Centre for Environmental Strategy
University of Surrey

PROFESSOR P. JARVIS, FRS
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Forestry Commission
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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

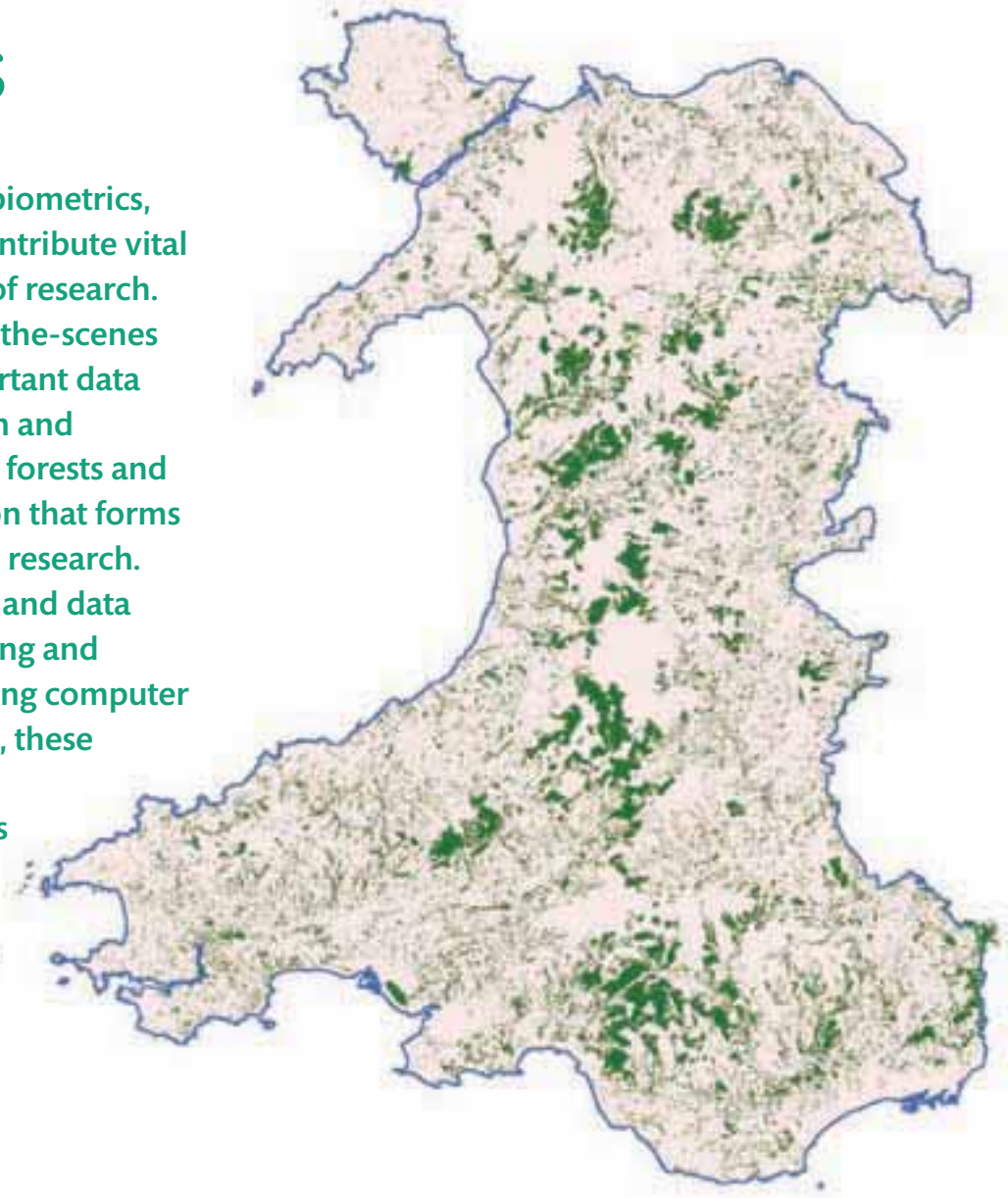
The Advisory Committee provides guidance for the Agency and the Forestry Commission on the quality and strategic placement of FR's research. The Committee also supports FR staff, by alerting us to new opportunities and networking to raise FR's profile. The Advisory Committee met in May 2008 at Silvan House in Edinburgh, before undertaking a tour to look at some of FR's research work in South Scotland. Meetings allow Committee members to 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.

At its second meeting of the year, in November 2008, the Committee received a report from an external Visiting Group to Ecology Division (chaired by Dr Keith Kirby with Professor Gary Fry and Professor Des Thompson 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. The Visiting Group was impressed by the range and quality of work being undertaken by Ecology Division. Its programmes were considered to be delivering well and achieving customer satisfaction. The Group made five overall recommendations focusing on the creation of larger units to increase synergy and flexibility, accounting for the time spent on advisory work, the approach to external contracts, the need for a more strategic basis for research and on staff development. The report and its recommendations have been given close consideration in the recent restructuring of FR into three centres, and the Group's detailed comments will continue to influence the relevant research programmes.

Over the year the Committee considered FR's strategy for winning external grants and awards, as well as FR's recent reorganisation. They also received an update on the implementation of the 2007 Visiting Group Report on Tree Health Division. A paper on research using genetically modified organisms was presented to the Steering Group for the UK Woodland Assurance Scheme and a horizon scanning exercise was undertaken for FR. Members of the Advisory Committee on Forestry Research have been closely involved in FR's development over the year, through the provision of expertise on review groups, committees and appointment boards. The FC and FR are very grateful for these inputs and also to the three members who are contributing to the ongoing independent UK review of forestry and climate change.

Biometrics, Surveys and Statistics

Our teams working on biometrics, surveys and statistics contribute vital support to many areas of research. Often playing a behind-the-scenes role, they provide important data such as the size, location and composition of Britain's forests and woodlands – information that forms the foundation of much research. From statistical analysis and data management to surveying and measurement, developing computer software and modelling, these roles are crucial for ensuring our woodlands are able to contribute effectively to today's key issues of climate change, biodiversity, economic viability and social value.



Woodland surveys

Considerable work this year has focused on the National Forest Inventory and the Production Forecast, both key Forestry Commission outputs that support policy and the forestry industry. We used recent aerial photographs to assess the locations and types of woodland and, for the first time, were able to plot woods as small as half a hectare. The woodland map for Wales has been completed (above), and those for Scotland and England will be available in autumn 2009. These woodland maps will be followed up by carefully designed field sampling to collect more detailed information on Britain's woodlands.

Production forecasting

Having identified the species, measured the trees, and assessed their age, we then use computer models to estimate the size and growth rate of all Britain's forests. Knowing when trees are due to be harvested, we use another set of models to estimate the potential amount of timber. One important task this year has been to simplify and increase the efficiency of these models and provide more options for forest management, as forests are being used in more complicated and diverse ways. The models will benefit forest managers and planners, who will find them easier and quicker to run when assessing production scenarios.

Statistical analysis and support

Our teams provide essential help to colleagues on statistics, database management, software development and geographic information systems, as reflected in the scientific outputs and practical tools described elsewhere. In addition, we also take forward the science of statistical analysis in its own right. For example, recent research explored experimental and survey data to find relationships between seedling growth, deer browsing and vegetation within woodland ecosystems. The aim of this work was to advise foresters on how to minimise the effects of deer browsing during woodland establishment. We carried out two studies: a detailed experiment at one site and a survey of different woodlands at another site. We then applied statistical models to the results to predict the risk of browsing from site characteristics such as the vegetation cover and the numbers and type of deer observed in the area. The findings have helped to improve understanding of the complex interaction between deer browsing and woodland vegetation.

Biomass energy

As a sustainable source of renewable energy, woodfuel is an increasingly important forest product. In response to the growing interest in renewable fuels, the Biomass Energy Centre (BEC) was launched in 2006 and is managed by Forest Research on behalf of the Forestry Commission, the Department for Environment, Food and Rural Affairs (Defra) and the Department of Energy and Climate Change (DECC). It provides an independent and authoritative source of information and advice on all aspects of bio-energy. In the past year, we have added the European technical specifications for solid biomass to the BEC website, and a Biomass Environment Assessment Tool from Defra and the Environment Agency. Interest in the website and BEC enquiries service has grown quickly over the last twelve months, with a total of over one million page hits and 3000 enquiries on a wide range of subjects associated with the production and use of biomass fuels. Visit **www.biomassenergycentre.org.uk**

Ecology

Our ecologists undertake applied research to provide an ecological basis for the sustainable management of forests, woodlands and associated land uses. Recent projects feature conservation and management of woodland species (including alien and invasive vertebrates) and genes; management of wooded and open habitats within forests, and the impacts of herbivores upon them; development of a landscape ecology approach to wooded, rural and urban landscapes; and the synthesis and use of ecological knowledge, including biodiversity indicators. Our research is conducted for policy makers, forest and land managers in Britain and the European Union.

Landscape connectivity

Our landscape ecology research focuses on validating the principles of landscape connectivity – the degree to which the landscape allows or hinders species movement – and developing tools to support forest restoration policies. We recently completed two collaborative projects on landscape connectivity for the Department for Environment, Food and Rural Affairs (Defra) and partners: a literature review considering 'Which landscape features affect species movement and dispersal?', carried out with the Centre for Evidence-Based Conservation at Bangor University; and testing 30 methods of assessing landscape connectivity, in collaboration with the Centre for Ecology and Hydrology (above right: group discusses landscape measures for the conservation of Black Grouse). Following this analysis, we recommended a connectivity indicator to assist biodiversity reporting. This has now been approved for application as part of the UK contribution for European biodiversity reporting in 2010. The contract reports are available from the Defra website; for more information on FR's work on this topic visit **www.forestresearch.gov.uk/landscapeecology**

Molecular genetics

Some land use policies assume that the creation of 'corridors' between different habitat patches ensures genetic connectivity, but there is little data to support or refute this. A recent research project has brought together our expertise in both molecular population genetics and landscape ecology to test this idea. We carried out a study on the Isle of Wight using the wood cricket (*Nemobius sylvestris*, pictured below) as a model woodland species. The island has a patchwork of fragmented forests separated by a range of possible barriers to gene flow. We developed microsatellite markers to determine the genetic variation within and between sampled populations and found that mainland populations are very different from those on the island. The next steps will be to examine which features of the landscape constitute barriers and corridors to gene flow, and then to extend the study to other species and landscapes.
For more information, visit **www.forestresearch.gov.uk/moleculargenetics**

Deer management

Deer are often regarded as an iconic element of British wildlife, but they can have detrimental impacts on our natural heritage, including biodiversity, and on the sustainability of land management. It would be useful to be able to predict how deer populations will respond to future changes in climate and land use, and how their population sizes and health are related to environmental conditions. Our work for the Deer Commission for Scotland, in collaboration with the Macaulay Institute, is developing methods to assess deer population health that will provide such understanding and can be easily and reliably recorded by deer managers. The methods are being tested on study sites with differing climatic conditions, habitat types, management objectives and animal densities. The criteria being assessed are consistency, utility and practicality. For more information visit **www.forestresearch.gov.uk/deermonitoring**

Alien and invasive vertebrates

We have been researching the management of grey squirrels for some years, and our current focus is the development of immuno-contraceptive methods, partly in conjunction with The Food and Environment Research Agency (formerly Central Sciences Laboratory). We have now extended our work to consider other possible vertebrate threats to woodland biodiversity and timber production, and a scoping study has identified several newly established or potentially expanding species. We are examining evidence for the degree of threat from these, starting with the risk of potential expansion of the edible dormouse (*Glis glis*, pictured above), and the development of monitoring and management techniques for wild boar (*Sus scrofa*) in woodland.

Environmental and Human Sciences

The past year has seen an increasing number of projects spanning the range of disciplines within environmental and human sciences. This is a reflection of both customer-driven demand and our researchers' concern to produce outputs highly relevant to forestry stakeholders. Our research projects are widely varied, from developing a tool to model air quality and human health before and after greenspace establishment, to providing best-practice guidance on how and when to harvest stumps and roots for bioenergy. Here, we highlight some examples of recent work.

Forest carbon and greenhouse gas balances

This year, we carried out a review entitled *The Carbon and Greenhouse Gas (GHG) Balance of UK Forests*. With input from a multidisciplinary team of researchers, the review summarises key information on carbon stocks and fluxes, and the fluxes of other greenhouse gases in UK forests, and how they are affected by forest dynamics, management and operations. It examines key information on forest carbon pools, looking in turn at trees, debris and litter, and soil carbon, and also discusses the carbon stocks and fluxes related to harvested wood products and the potential of wood substitution. The review considers all available information on the fluxes of the three important greenhouse gases from forest soils – carbon dioxide, methane and nitrous oxide – and shows available information on the fluxes arising from forestry operations. GHG emission data were incorporated into calculations to model GHG emissions and carbon balances of example forest management cycles. For further information, visit **www.forestresearch.gov.uk/carbon**

Forest soils and biodiversity

This year we completed the UK's contribution to Biosoil, a project co-funded under the European Union (EU) Forest Focus Regulation to examine the feasibility of systematically monitoring forest soils and biodiversity at a European scale. For Great Britain, this involved the detailed soil sampling and chemical analysis of 167 forest plots distributed across Scotland, England and Wales. We submitted the data to the EU at the end of December 2008. This provides a very valuable baseline for evaluating the current condition of forest biodiversity and soils, including soil carbon stocks. It will also enable the assessment of any future changes to forest soils and biodiversity. For further information, go to **www.forestresearch.gov.uk/biosoil**

Woodland heritage services

In 2008, we launched the Woodland Heritage Services Group, offering specialist advisory services to managers of heritage projects involving woodland. The Group features a wealth of archaeological and ecological knowledge, plus technical expertise in modern remote-sensing surveys and mapping, backed up by a solid understanding of woodland management. The Group advises customers on heritage protection during forest operations and in the development of management plans. All aspects of the historic environment are included: from advice on individual veteran trees and archaeological features (e.g. WWII storage depot pictured below), to operational practices for historic landscapes. The Group can also carry out light detection and ranging (LiDAR) surveys to identify archaeological and other features beneath the woodland canopy, and has carried out several successful surveys this year. For further information, see **www.forestresearch.gov.uk/woodlandheritageservices**

Greenspace impacts and sustainability

We have developed an interdisciplinary approach to monitoring and evaluating the impacts and sustainability of greenspace. Named Methuselah, the strategy uses primary data collection, such as interviews and site management records at a network of sites, and national datasets. We carried out field tests of Methuselah at a sample of regeneration sites to assess their accessibility for leisure and recreation, the types of visitors using the sites and whether existing records could be used more effectively to demonstrate their impacts. With further development, Methuselah will help the Forestry Commission and others to evaluate the impacts and outcomes of regeneration activities from social, environmental and economic perspectives.
For more information, go to **www.forestresearch.gov.uk/methuselah**

Forest Management

Our forest management researchers are responsible for research and development covering the sustainable management of the forestry–wood chain. A strength of this group is the extent of its international collaboration, for example between tree-breeding researchers and colleagues in Canada. This has helped us to improve methods for tissue culture and cryopreservation of Sitka spruce, as well as increasing our knowledge of the Sitka spruce genome. Also this year, we have provided guidance for forest managers confronted with meeting varied demands plus the need to adapt forests to predicted climate change. Here, we offer a taste of this work.

Guidance on stump harvesting

There is increasing interest in using forest biomass as an alternative energy source for power plants. As around 25% of the mass of a tree can be in its stump and roots, attention has turned to the possibilities of stump harvesting as a source of biomass. In a preliminary study in south Scotland, just under 70 per cent of the stumps on one site could be harvested. However, the carbon benefit of using stump wood to offset fossil fuel consumption must be balanced against risks such as loss of soil carbon after stump removal. Other potential drawbacks include increased soil erosion, soil and water acidification, and reduced stream water quality and soil fertility. To help manage these risks, we have issued interim guidance on site selection and good practice for stump harvesting.

We are also undertaking experimental work to provide improved data on the longer-term effects of this new practice. For more information visit **www.forestresearch.gov.uk/stumpharvesting**

Short rotation forestry

Short rotation forestry can be used to produce biomass from fast-growing tree species. These could include native species such as ash and non-natives such as eucalyptus (below) which has grown well in arboreta and privately funded trials. Over the past year, interdisciplinary work has progressed to field experiments to fill important knowledge gaps. We are establishing a network of new trials in Scotland and England to examine the viability of short rotation forestry and collecting data from relevant existing plantings. Taken together, these sources will provide best practice guidance on short rotation forestry, including its carbon balance, economic viability and environmental impacts.

Tree establishment

Many factors influence the success of tree establishment and need to be taken into account when planting trees. Until now, existing knowledge has been contained in many technical and scientific publications that may not be easily available to a forest manager. Therefore, we have developed a new tool to make this simpler – the Establishment Management Information System (EMIS). This integrates existing knowledge on the factors influencing tree establishment in upland forests to provide site-specific best-practice guidance. The user inputs site information to calculate the environmental variables that affect species choice and EMIS identifies appropriate management practices.

We will update EMIS regularly to include new research findings. For example, EMIS will include recent EU research on forest management to reduce the use of herbicides in Europe's forests. A full publication can be found at **www2.clermont.inra.fr/cost-e47/**

Improved management of native woodlands

A major aim of current national forest policy is to conserve and expand Britain's native woodlands, not least because of their key contribution to biodiversity. As woodland development can be divided into a series of distinct structural phases, a sustainable forest should, in theory, contain a proportion of each phase. Each phase is characterised by features such as the amount of young seedlings, the number of big trees and the occurrence of deadwood. We have recently improved the current description of these phases for Scotland's native pinewoods. This will allow us to define more accurately the existing structure of a specific forest, and to identify appropriate silvicultural techniques that will take the forest towards a more favourable state. An example is given at **www.forestresearch.gov.uk/glenaffricplan**

Tree Health

Research into tree health has the dual function of underpinning authoritative advice about a wide range of established tree disorders, and assessing the risks of newly detected or listed quarantine pests and pathogens. Information about our recent research findings is available on the Forest Research website. Heightened concern about how introduced organisms and climate change are affecting tree health makes these webpages a popular source of information. Here, we highlight our advice services and some key areas of recent research.

Pests and diseases – new and old

This year Forest Research entomologists and pathologists responded to over 1200 enquiries sent into the Tree Health Advisory Service, answering information requests and identifying pests and pathogens. This included on-site visits for disease diagnosis and safety assessments of potentially hazardous trees. Many enquiries were about horse chestnut (*Aesculus hippocastanum*) because of the highly visible impact of leaf miner (*Cameraria ohridella*) and bleeding canker disease. We have developed a real-time polymerase chain reaction diagnostic tool for faster and more reliable detection of the pathogen *Pseudomonas syringae* pv *aesculi*, which causes the bleeding cankers. See **www.forestresearch.gov.uk/bleedingcanker**

We also provide scientific support to underpin the Forestry Commission's Plant Health Service. Most recently this included phytosanitary work on pine lappet moth (*Dendrolimus pini*, pictured above right) in Scotland; interception of timber infested with quarantine pest pinewood nematode (*Bursaphelenchus xylophilus*); and contributing to pest risk analyses for pests including *Phytophthora ramorum* (cause of sudden oak death), oak processionary moth, and the ash dieback pathogen *Chalara fraxinea*.

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Acute oak decline

We have been investigating the causes of the increasing numbers of native oaks with extensive stem bleeding leading to acute decline. On some sites many trees are affected and die within just 3–5 years of the first symptoms. Samples from affected trees have shown that the bleeding (pictured below) is frequently associated with the presence of bacteria, particularly those within the genera *Serratia* and *Brenneria*; trees compromised by the bleeding lesions may also then be attacked by beetles. We have inoculated oak saplings to determine whether bacteria are the immediate cause of the bleeding. It may be several months before these tests yield results, but molecular analysis of *Serratia* shows it to be very similar to a species of bacterium recently found causing bleeding and dieback on some Mediterranean oak species. For more details, see **www.forestresearch.gov.uk/oakdecline**

Stump treatment

Heterobasidion annosum, which causes root and butt rot, is another serious pathogen of commercial conifer forestry; in Europe estimated losses exceed €800 million per year. However, plantations can be treated to prevent infection by applying chemical or biological control agents to stumps created during thinning or clear-felling. We are testing a biological stump treatment based on the fungus *Phlebiopsis gigantea* (Rotstop®), which could be effective on both spruce and pine stumps, unlike the current UK-registered treatment (PG Suspension), which is approved only for use on pine. We have also developed computer software to aid foresters in judging when stump treatment is needed to control *Heterobasidion*, by evaluating the level of risk based on soil type, climate and tree species.
See **www.forestresearch.gov.uk/rootandbuttrot**

Increasing impact of red band needle blight

Red band needle blight (*Dothistroma septosporum*) is an economically important and serious disease affecting several coniferous species, especially pines (pictured below). Its spread and severity has continued to increase this year on Corsican and lodgepole pine in England and Scotland, and it has now been found also on Scots pine at several sites. Our research shows that both mating types of the fungus are present in Britain, with initial studies suggesting considerable genetic diversity. The ability of the pathogen to change and adapt, combined with favourable climatic conditions, is a likely driver of the current epidemic, increasing the distribution and host range of the pathogen. It also highlights the risks of invasive pathogens to Britain's plantation forests, including our native pine species. More information is available at **www.forestresearch.gov.uk/redbandneedleblight**

Publications

Forest Research publishes a wide range of material, from corporate reports and plans, to brochures, project summaries and technical reports. In addition, our researchers publish peer-reviewed articles in scientific journals and produce books through external publishing houses.

Forestry Commission technical publications

The following titles were published during the year ending 31 March 2009.

Published by Forest Research

To obtain copies of FR publications, email: library@forestry.gsi.gov.uk or visit **www.forestresearch.gov.uk/publications**

Corporate publications

Forest Research annual report and accounts 2007–2008 (£18.55)

Forest Research corporate plan 2009–2012 (online publication, free)

Newsletters

FR News (formerly *FR Eye*). Forest Research's quarterly newsletter, giving details of recent projects and developments (online publication, free) **www.forestresearch.gov.uk/frnews**

Ecotype. Biodiversity and conservation newsletter of Ecology Division (online publication, free) **www.forestresearch.gov.uk/ecotype**

Growing places. Social and Economic Research Group newsletter from Environmental and Human Sciences Division (printed and online publication, free) **www.forestresearch.gov.uk/growingplaces**

Path News. Pathology bulletin of Tree Health Division (online publication, free) **www.forestresearch.gov.uk/pathnews**

Booklets and leaflets

Forest Research: Climate Change projects. A four-page summary of climate change research at FR, published September 2008 (online publication, free)

Problems on plane trees
Pathology Advisory Note 7
Kath Tubby and David Rose

Policy into practice. Employment for ex-offenders: an innovative approach
Claudia Carter and David West*

Planning for lowland habitat networks in Scotland: a landscape-scale approach
Darren Moseley and Mike Smith

Social research project summaries produced by FR's Social and Economic Research Group (online publications, free):
Leisure landscapes: exploring the role of forestry in tourism

The impact of trees on the well-being of residents on two inner-London social housing estates

The Chopwell Wood Health Project

Hill Holt Wood: social enterprise and community woodland

Forests for recreation and nature tourism – European COST Action E33

Forest School: a marvellous opportunity to learn

Evaluating Cydcoed – have community-managed woodlands provided social and economic benefit?

New pathways for health and well-being in Scotland: research to understand and overcome barriers to accessing woodlands

West Midlands woodland and health pilot evaluation

Environmental volunteering: motivations, benefits and barriers

Woodland owners' attitudes to public access provision in south-east England

*Author outwith the agency.

New Forest Rural Pathfinder project: stakeholder involvement in the New Forest

Consultation and community involvement in forest planning: research in Cranborne Chase and North Dorset

Perspectives on forests and trees: a view from Vermont

People's experiences of woodlands in north-west and south-east England

Wood products from sustainably managed woodlands: review of consumer awareness and best marketing practice

Exploring disabled people's perceptions and use of forest recreation goods, facilities and services in Scotland, England and Wales

Assessing the contribution of forestry grants to equal access for disabled people to recreation goods, facilities and services in Scottish woodlands

Enhancing the forest sector's contribution to equal access for disabled people to recreation goods, facilities and services in Scottish forests

Forestry carbon offsets: methods and approaches

Wild Harvests – Social, cultural and economic values of non-timber forest products

Published by the Forestry Commission

The publications listed below have been written by Forest Research staff for the Forestry Commission. For more details or to order an FC publication, visit the Forestry Commission online publications catalogue at **www.forestry.gov.uk/publications**

Research Notes (free)

FCRN001 *The Environmental Change Network at Alice Holt Research Forest*
Sue Benham

FCRN002 *Red band needle blight of conifers in Britain*
Anna Brown

FCRN003 *Benefits of improved Sitka spruce: volume and quality of timber*
Shaun Mochan, Steve Lee and Barry Gardiner

FCRN102 *The economic and social contribution of forestry for people in Scotland*
David Edwards, Jake Morris, Liz O'Brien, Vadims Sarajevs and Gregory Valatin

FCRN301 *Impacts of climate change on forestry in Wales*
Duncan Ray

FCRN301(W) *Effeithiau newid yn yr hinsawdd ar goedwigaeth yng Nghymru*
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Research programmes and contracts

Forest Research carries out a wide range of research programmes, encompassing topics from across the spectrum of forestry and related environmental subjects. Our work aims to support and enhance forestry and its role in sustainable development. This year's programmes are listed as follows.

Major research programmes undertaken by Forest Research

Programmes funded by the Forestry Commission

Project leaders' names are given for each programme.

Biometrics, Surveys and Statistics Division

Modelling and forecasting forest resources
Robert Matthews
Improve methods, models and systems for forecasting growth and yield of forests.

Forest mensuration systems
Robert Matthews
Develop and promote systems and instruments for the efficient and accurate measurement of trees and timber to support industry and national/international standards. Develop and maintain the national network of permanent and temporary periodic growth and yield plots to support measurement, growth and yield studies.

National Inventory of Woodland and Trees (NIWT)
Mark Lawrence
Undertake the Forestry Commission's National Inventory of Woodland and Trees, assessing woodland cover and providing national statistics on forest systems. Create the digital woodland map for Britain. Promote the use of GIS and remote sensing technology to provide spatially referenced data on the woodland cover of Britain and its changes.

Remote sensing
Juan Suarez
Evaluate and promote the potential of remote sensing technologies for operational use in the management of British forests.

Biomass Development
Ian Tubby
Provide best practice guidance to the public and industry, together with information on all aspects of biomass fuels and associated conversion technologies via the Biomass Energy Centre: **www.biomassenergycentre.org.uk**

Ecology Division

Indicators for assessing and monitoring biodiversity and ecosystems
Duncan Ray and Mike Smith
Identify potential biodiversity indicators, develop and test monitoring methods and disseminate findings.

Priority species and their conservation
Alice Broome
Conduct research to support the protection and encouragement of woodland species identified as priorities within the UK Biodiversity Action Plan.

Landscape ecology and spatial planning
Kevin Watts
Improve understanding of how biodiversity responds to management at the landscape scale, and translate this into practical management guidance for forest design.

Ecological site classification for climate change
Duncan Ray
Develop ecological site classification (ESC) to accommodate climate change projections and enable it to be implemented at a range of spatial scales.

Decision support for forest ecology
Duncan Ray
Develop decision-supporting tools for biodiversity and in particular produce a knowledge base for forest managers wishing to understand the significance of Habitats and Rare, Priority and Protected Species (HaRPPs).

Impact of large herbivores on woodlands
Helen Armstrong and Robin Gill
Provide a sustainable basis for deer management in UK woodlands by investigating and developing new techniques and models of impacts and damage, population dynamics of deer, deer density assessment and grazing management.

Reducing the impact of alien and invasive vertebrates
Brenda Mayle and Roger Trout
Scope the potential for impact of alien and invasive vertebrates. Develop techniques and materials for cost effective protection of trees and woodland biodiversity from mammal damage, particularly by grey squirrels.

Genetic conservation
Joan Cottrell and Jason Hubert
Study the genetic variation and gene flow in natural populations. Assess the level of adaptive variation in the field trials of populations of native species. Apply molecular methods to a range of research questions.

Scientific support for Forest Reproductive Material Regulations
Sam Samuel
Devise methods for inspection of material proposed for registration. Maintain the National Register of Basic Material.

Priority native woodland habitats
Ralph Harmer and Steven Hendry
Examine methods for managing, restoring, regenerating and extending priority woodland habitats.

Management (and restoration) of Priority open habitats
Russell Anderson
Investigate and provide guidance on the restoration and management of open ground habitats.

Environmental and Human Sciences Division

Soil sustainability
Elena Vanguelova
Research to identify and evaluate the potential impacts of forest management, air pollution and climate change on soil status, functions and dynamics. Provide expert advice and develop guidance on best management practices for the protection of forest soil sustainability.

Land regeneration and urban greenspace
Tony Hutchings
Improve establishment methods and management practices for woodland and other green uses in urban and on disturbed (brownfield) sites, taking into account changes in forestry and land-use policy, planting opportunity, environmental and socio-economic impacts, climate change, contamination, and waste minimisation and utilisation. Provide expert advice and develop best practice guidance on land regeneration issues.

Forest hydrology
Tom Nisbet
Study the impacts of forests and forestry management practices on water quality and quantity. Develop and assess guidance on best management practice for the protection of the freshwater environment within forests. Provide expert advice on forestry–water issues.

Intensive forest monitoring and evaluation of forest ecosystems
Nadia Barsoum
Determine the role of climate change and air pollution in forest condition and growth through long-term intensive environmental monitoring in forest ecosystems, in compliance with EC regulations. Provide data under the Convention on Transboundary Air Pollution for the calculation and mapping of critical loads.

Climate change impacts on forest function
James Morison
Monitor the effects of climate change and analyse trends in forest function through environmental monitoring (e.g. the Environmental Change Network, International Phenology Garden), other experimental work and predict the likely future impacts through modelling studies using climate change scenarios. Maintain a long-term carbon dioxide flux monitoring station in lowland oak woodland in the UK, and investigate the effect of management operations.

Forestry as an instrument for mitigating climate change
Sirwan Yamulki and Robert Matthews
Evaluate and demonstrate mitigation options based on measurement and management of forest and wood-processing sector carbon and greenhouse gas (CO_2, CH_4 and N_2O) emissions and dynamics. Produce calculation tools and knowledge resources on forest carbon and greenhouse gas balances for end-users. Measure and model greenhouse gas fluxes from selected forest systems, and under different management options.

Cultural heritage and the historic environment
Peter Crow
Develop methods, tools and guidance to aid the day-to-day management of historic environment features such as archaeological evidence, veteran trees and historic woodlands/landscapes.

Social Research
Anna Lawrence
Examine relationships between communities and woodlands in support of FC policies on sustainable forest management. Work concentrates on community involvement, publicly held values, health and well-being, sustainability indicators, impact assessment, recreation, access and rural development. There is an increasing focus on decision-making processes, planning and partnerships, and how science is communicated to policy-makers and practitioners.

Economic Research
Gregory Valatin
Investigate the economics of sustainable forest management, including climate change mitigation and adaptation, and the potential for adopting economic instruments in forest policy. Provide economic advice to other research programmes.

Fire vandalism pilot study in Wales
Andy Moffat and Jake Morris
Examine the physical and social drivers behind wildfire occurrence in the South Wales Valleys, evaluate existing mechanisms to reduce arson and seek to identify new ways to mitigate this problem.

Forest Management Division

Sustainable establishment systems
Mike Perks
Integrated studies of the effect of nursery practice, seedling physiology, plant handling methods, site preparation and maintenance upon tree establishment and subsequent growth.

Timber properties
Barry Gardiner
Investigate the impact of silvicultural practices on timber quality in conifers, especially spruce. Main emphasis is on impact of site factors (e.g. exposure, fertility) on quality.

Restoration and management of upland native woodlands
Colin Edwards
Research into the structure, dynamics and silviculture of native woodland ecosystems in northern and western Britain to support restoration and extension for ecological and economic benefits. Emphasis is on Scots pine forests, birchwoods and the Atlantic oakwoods.

Continuous cover silviculture
Gary Kerr
Evaluate canopy structure manipulation to promote suitable microclimates for seedling establishment and facilitate natural regeneration to enable wider use of alternative silvicultural systems to patch clearfelling (continuous cover forestry).

Tree stability and climate
Bruce Nicoll
Research to reduce wind damage to British forests using a GIS-based windthrow risk model for predicting the probability of windthrow in Sitka spruce forests. Carry out studies of root development and architecture in support of the model.

Integrated forest vegetation management
Ian Willoughby
Investigate alternatives to conventional vegetation management for new planting and regenerating existing woodlands, including reducing synthetic chemical inputs and direct seeding.

Seeds, seedlings and sustainable silviculture
Peter Gosling and Richard Jinks
Improve tree seed quality and performance to reduce costs and increase reliability of direct seeding and natural regeneration.

Management of long-term experiments
Alan Harrison
Retention of long-term forest experiments; include maintenance, assessment and provision of data.

Modelling for mixed age and mixed species stands
Tom Jenkins
Evaluation of single tree growth models available in other countries that could be used to predict the growth of the mixed species and structure stands that are being created as a result of the greater use of Continuous Cover Forestry systems in British forestry. The work is carried out by a team comprising members of Biometrics and Forest Management Divisions.

Operational efficiency in a sustainable wood chain
Ian Murgatroyd
This programme covers the investigation of operational issues and the provision of solutions that will contribute to improved efficiencies within the forestry sector. Four main areas of investigation are: forest establishment and maintenance; harvesting and transport; low impact silvicultural systems and ecosystem management; and safety and ergonomics.

Native woodland survey of Scotland
Alistair Macleod
Fieldwork is being carried out by Technical Services Unit (TSU) on behalf of Forestry Commission Scotland. First comprehensive survey of the extent, location and condition of all native woodlands in Scotland.

Tree breeding for the future
Steve Lee and Jason Hubert
All aspects of tree breeding in conifer and broadleaves species including Sitka spruce, Scots pine, Corsican pine, Douglas fir, larch and oak, ash, sycamore, beech and birch. Advanced breeding technologies considered include tissue culture and cryopreservation plus the development of techniques for marker aided selection.

Silvicultural impacts on carbon
Mike Perks
Understanding how forest management practices influence the carbon stocks contained within forest soils is an important element in ensuring British forests contribute to the mitigation of predicted climate change. Research into the impact of establishment practices such as cultivation and weed control on the carbon cycle in forests in upland Britain.

Tree Health Division

Scientific Support for Phytosanitary Regulation
Hugh Evans
Research into the risks from indigenous and non-indigenous forest pests and pathogens. Co-ordination and implementation of surveys in relation to retention of EU Protected Zone status for named bark beetle pests. The use of Pest Risk Analysis techniques to determine risks from named non-indigenous pests and pathogens.

Impacts of pests under changing management
Nigel Straw
Investigate the implications of alternative silvicultural systems in relation to insect abundance and diversity, especially for key pest species. Study sites are located in several forests in Wales. This work builds on previous studies of quantitative relationships between insect populations and their impact on trees, particularly impact of green spruce aphid *Elatobium abietinum* on Sitka spruce.

Integrated Forest Management *(Hylobius)*
Roger Moore
Building on studies of the population dynamics of *Hylobius abietis*, decision support systems for management of the restocking problem are being developed. This enables the selective use of biological control to reduce populations of *H. abietis* to sub-economic levels through the managed application of insect parasitic nematodes for both the FC and private sectors.

Advice and scientific support for tree health
Joan Webber
Provide an advisory service to determine the causes of ill health in trees and provide advice and information on pest and pathogen identification, management and control. Disseminate the information to all interested parties through outreach activities such as Forest Health Days, workshops and seminars. Specific topics under detailed assessment include assessing the impacts of leaf miner and bleeding canker on the health of the horse chestnut tree.

Non-chemical protection
Katherine Tubby
Research the potential for biological and non-chemical control of tree diseases, with special emphasis on root and butt rot of conifers caused by the fungal pathogen *Heterobasidion annosum*. Integrate this information into effective approaches to management and control of tree diseases.

Red band needle blight
Anna Brown
Research and survey the extent, severity and rate of spread of red band needle blight (caused by *Dothistroma pini*) in the UK with particular reference to East Anglia Forest District. Determine the impact that this could have on tree mortality and timber yields of Corsican pine and the suitability of the different control measures.

Risk assessment of invasive pathogens – *Phytophthora ramorum* and *P. kernoviae*
Joan Webber
Investigate the biology and epidemiology of the two new quarantine tree pathogens, *Phytophthora ramorum* and *P. kernoviae*, which infect tree species within the Fagaceae. Use information generated from this research in Pest Risk Analysis to determine the extent of the risk these pathogens pose to trees in the UK, their impact and opportunities for eradication and control.

Pests and pathogens in a changing climate
David Wainhouse
Use of model systems to predict the impact of changing climate. These include (1) the influence of voltinism in *Hylobius abietis* and its effect on geographical variation in pest status. This uses *H. abietis* as a model system to study the effects of climate change on insect pest generation time; (2) the interaction between drought stress and fungal disease of trees with particular reference to Sitka spruce in Scotland; and (3) the changing susceptibility of oak (*Quercus* spp.) to broadleaved pests and pathogens influenced by climate.

Programmes part-funded by the European Commission

TREEBREEDEX: Integrated information on tree breeding. Linking information on tree breeding programmes across major European countries.

BIOSOIL: The largest single soil monitoring exercise implemented so far at an EU scale, the main aim is to establish an improved common European baseline of forest soils for environmental applications – carbon stock assessment, acidification, eutrophication and impacts of climatic change.

EUFORGEN: Collaboration between European countries to promote conservation and sustainable use of forest genetic resources.

EFORWOOD: Sustainability impact analysis of the European forestry wood chain under different scenarios and developing decision support tools to help evaluate changes in practice and market fluctuations.

SENSOR: Sustainability impact assessment: tools for environmental, social and economic effects of multifunctional land use in European regions.

STORMRISK: Development of STORM resistant landscapes through regional cooperation, adapted management and RISK communication. Working with partners in northern Europe to adapt existing decision support tools to help improve management practices.

COMFOR: Collective work science approach to solving the common problems of occupational health and performance in European forest operations SMEs.

FORESTCLIM: Transnational forestry management strategies in response to regional climate change impacts.

FUTMON: Further development and implementation of an EU-level Forest Monitoring System.

Northern Periphery Programme – Northern ToSIA: Carrying out a sustainability impact analysis of forest management practices in selected forests in northern Europe and understanding the interactions with needs of various stakeholder groups.

Northern Periphery Programme – Scots pine: Combining management, processing and end-users to demonstrate how to make best use of the Scots pine resource in northern Europe.

NOVELTREE: Evaluation and validation of advanced breeding strategies for major tree species in Europe.

REINFFORCE – Atlantic Coast: Adapting Atlantic forests in Europe to predicted climate change including the potential role of different tree species and the risk from novel pests and pathogens.

Programmes funded by other organisations

BP Exploration Operating Co. Ltd
Scottish Forestry Alliance Biodiversity Group. Method development, data collection and analysis to provide biodiversity monitoring for new native woodlands established on Scottish Forestry Alliance sites.

Centre for Ecology and Hydrology (CEH)
Inventory and projections of UK emissions by sources and removals by sinks due to Land Use, Land-Use Change and Forestry (LULUCF).

Central Science Laboratory and Scottish Natural Heritage
Supporting a Defra-led project that aims to test and adapt fertility control agents for target species that have been developed in the US, and in particular work on the grey squirrel *(Sciurus carolinensis)*.

COFORD
CLIMADAPT: Development of an Ecological Site Classification (ESC) for Ireland. Assessment of species suitability in Ireland, and the impact of IPCC climate change scenarios on forest stands and forest ecosystems using an ESC.

Deer Commission for Scotland
Management of Roe deer in peri-urban Scotland. Determine current attitudes of those who might manage peri-urban deer, i.e. private landowners and landholding organisations. Establish the distribution and scale of the peri-urban Roe deer population in the Central Belt.

A joint project with Macaulay Institute to develop and test a methodology for measuring deer health and welfare and how it responds to climate and land use changes.

Department for Business, Enterprise and Regulatory Reform (BERR) and Aspire Defence
The use of biologically enhanced charcoal for *in-situ* remediation of contaminated land.

Department for Environment, Food and Rural Affairs (Defra)
Assessment of the ecological value of hedgerow trees for invertebrates.

Habitat Connectivity – Developing an indicator for UK and country level reporting.
Phase 1 Pilot Study. A joint project with CEH to identify and test the most suitable and accepted methodology and data sources for the production of UK and country level indicators of functional habitat connectivity and provide recommendations for further development.

'Which landscape features affect species movement?' A systematic review in the context of climate change. A joint project with CEBC Bangor University to assess, through systematic review with expert consultation, the strength of the empirical evidence underpinning the development of functional habitat connectivity as an adaptation to climate change.

Defra/Forestry Commission
A joint project with The Food and Environment Research Agency (formerly Central Sciences Laboratory) to develop approaches to evaluate and mitigate the environmental impact of wild boar.

Department for Innovation, Universities and Skills (DIUS)
Public Sector Research Exploitation Fund, third round. A three-year capacity building project commenced in April 2006 to assist Forest Research to develop its innovation and commercialisation activities.

Public Sector Research Exploitation Fund, fourth round. An Innovation And New Markets Project commenced in April 2008. Forest Research is working with the Northern Ireland Forest Service and the wider Forestry Commission to develop the wider economic benefits of forestry and assist the development of new markets.

Economic and Social Research Council (ESRC)/ University of Leeds
SUPERGEN: The production of different types of biomass and their behaviour in thermal conversion processes, with particular emphasis on the interaction and interface between production and conversion.

Engineering and Physical Sciences Research Council (EPSRC)/University of Surrey
Pollutants in the urban environment.

ESRC/University of Sheffield
Rivers project.

Forestry Commission Scotland/Scottish Natural Heritage
Production of a toolbox of methods for assessing grazing impacts, including development of a qualitative method for assessing herbivore impacts on woodlands and monitoring of a pilot grazing grant scheme.

Herefordshire Nature Trust
Woolhope Dome Resource Assessment. Development and field testing of a rapid method to estimate the standing biomass in woodlands that have not been thinned for many decades. The aim is to use these estimates to recommend sustainable woodfuel removals.

Institute of Grassland and Environmental Research
Development of sustainable heat and power fuelled by biomass from short rotation coppice in Wales.

Natural Environment Research Council (NERC)
QUEST forestry demonstrator. Deliver the scientific basis for project verification methods and project design principles and guidelines that assure that forestry-based mitigation projects have maximum benefits for climate, social concerns and the environment, including biodiversity, water resources and soils.

QUEST QUATERMASS. This project, which is led by Dr Jeremy Woods of Imperial College London, will estimate the potential of terrestrial ecosystems to mitigate climate change.

PR Energy Power
Phytosanitary treatment of conifer woodchips to eliminate the risk from invertebrate pests.

Renfrewshire County Council
The use of integrated habitat networks to identify key areas for habitat restoration for the eight unitary authorities within the Glasgow and Clyde Valley (GCV) Green Network area.

Rural Economy and Land Use Programme (RELU)
A case study on integrated deer management.

Assessing and communicating animal disease risks for countryside users. An inter-disciplinary project investigating how to assess and communicate risks of zoonotic diseases, such as Lyme disease. The project involves ecologists and social scientists from FR, zoologists at the University of Oxford and psychologists at the University of Surrey.

Lessons from Dutch elm disease for assessing the threat from sudden oak death in Britain.

Scottish Natural Heritage (SNH)
Minard cattle grazing trial: Monitoring of cattle grazing as vegetation management to improve conditions for Black Grouse.

Meeting the data needs of ecological modelling: establishing a 'species trait library'. Design, establish and begin to populate an open-access internet-based repository of species and habitat data relevant to the needs of spatial landscape planning, ecological modelling and land management decision making in Scotland.

Carry out survey of stand structure and develop a management plan to provide favourable conditions in Cuilvona and Craigmore Woods.

South East England Regional Development Agency (SEEDA)
Grant to assist the establishment of the Rural Research and Strategy Partnership. This Partnership aims to support and stimulate interdisciplinary research between Forest Research, the Universities of Brighton, Reading, Surrey and Sussex and the University for the Creative Arts. It focuses on topics important for rural sustainability.

South West Woodland Renaissance
South West woodland resource assessment: carry out woodland inventory and production forecasting for productive conifer woodlands within the SW region of England. Highlight potential constraints to resource availability and analyse production forecast results against existing and potential timber markets.

United States Department of Agriculture (USDA)
Studies on *Phytophthora ramorum* and *P. kernoviae* to evaluate infection behaviour.

Studies on the inoculum behaviour of *Phytophthora ramorum* and its role in asymptomatic infection.

Research contracts awarded by Forest Research

Environment Agency (Wales)
Effects of forestry on surface water acidification.

Fountain Forestry
Water monitoring, Halladale.

STFI-PACKFORSK
Analysis of microfibril angle and other cellular properties of Sitka spruce trees.

University of Aberdeen
Woodland quality analysis of natural regenerated Sitka spruce. Support for an MSc project seeing whether the timber of naturally regenerated trees differs materially from that from known planted stands.

University of Bristol
Landscape history of Savernake Forest.

University of Edinburgh
Impacts of ultraviolet-B radiation on leaf decomposition in forest trees.

Competitive interactions between fungi colonising Scots pine needles.

University of Gloucestershire
Cydcoed Evaluation Project: Exploring the market and non-market values of Cydcoed intervention.

University of Newcastle
Carbon turnover in forest and grassland soils – will global warming turn carbon sinks into sources?

University of Ulster
Impact of defoliating insects in a changing forest environment.

University of York
The role of biotic interactions in determining species' responses to climate warming.

People and locations

Permanent and fixed-term staff as at 31 March 2009.

Chief Executive
- Dr James Pendlebury, BSc, PhD, MIWSc

Research Director
- Professor Peter Freer-Smith, BSc, PhD, DSc

Personal Secretaries
- Claire Holmes
- Helena Ladbury

Head of Northern Research Station
- Chris Quine, MA, MSc, FICFor, PhD

Head of Unit, Wales (Aberystwyth)
- Hugh Evans, BSc, DPhil, FRES,

Quality Assurance Manager
- Carl Foster

Business and Innovation
- Alison Melvin, BA
- Jane Devlin, BSc
- Anja Ueberjahn-Tritta, BSc, PhD

Human Resources and Administration
- Ken Charles, FMS, *HR and Administration Director*
- Wendy Groves
- Trudy Smith
- Janet Lacey
- Andrew Phillips
- Heather Russell
- Mandy Sennett
- Sally Simpson
- Amanda Smith
- Mike Wheeler
- Mike Young
- Martin Abrahams, *Head of Administration at NRS*
- Gerry Cockerell
- Evelyn Hall

Finance and IT
- Sandra Smith, ACMA, *Finance and IT Director*
- Laura Caless
- Carol Knight
- Timothy Knight, BSc
- Carole Martin
- Paul Morris
- Corinne Russell
- Janet Turner
- Ann Williams
- Wayne Blackburn, BSc, *Head of IT Services*
- Alec Gaw, BSc

Communications
- Xanthe Christophers, BSc, MSc, PGCE, PhD, *Communications Director*
- Joanne Davies, BSc
- George Gate
- David Georghiou, BA
- Eleanor Harland, MA, DipLib
- Catherine Oldham, BA, MA, DipLib, MCLIP
- Sally Taylor
- Hugh Williams, BA, MSc, PhD (Acting Communications Director)
- Glenn Brearley
- Kirsten Hutchison, MA, DipEd, MSc
- Steve Penny, BSc, MSc
- Chris Jones, BSc

Biometrics, Surveys and Statistics Division
- Helen McKay, BSc, PhD, MICF, CEnv, *Head of Division*
- Catia Arcangeli, MSc, PhD
- Eric Casella, MSc, PhD
- Joy Cornwell
- Ian Craig
- Paul Henshall, BSc
- Geoff Hogan, BSc, DPhil
- Ewan Mackie, BSc, MSc
- Robert Matthews, BSc, MSc
- Geoff Morgan, BSc, MSc, PhD
- Lyn Pearce
- Tim Randle, BSc
- Marc Sayce
- Paul Taylor, MA, MSc, MPhil
- Ian Tubby, BSc
- Miriam White, HND, BSc, MSc
- Christopher Vials, BSc
- Stephen Bathgate, BSc, BSc, PGDip, MSc
- Christine Brown, MSc
- Graham Bull
- Shona Cameron
- Lynn Connolly
- Tom Connolly, BSc, PhD
- Vera Correia
- Fauzia Davidson, BSc, MSc
- Justin Gilbert, BSc
- Celia Igreja Dias
- Mark Lawrence, BSc, MSc
- Linda Legge
- Andrew Peace, BSc
- Lynn Rooney
- Juan Suárez-Minguez, BSc, MSc
- Esther Whitton
- Adam Ward
- Mary Caldwell
- Tom Jenkins, BSc, BSc, FICFor

FR employs 280 staff, some of whom work part time, giving a total staff number of 260 full-time equivalents at 31 March 2009.

KEY: Alice Holt · Northern Research Station · Technical Development Office · Field Station

Ecology Division

- Chris Quine, MA, MSc, FICFor, PhD, *Head of Division*
- Stuart A'Hara, BSc, MSc, PhD
- Russell Anderson, MSc
- Helen Armstrong, BSc, PhD
- Rebecca Brassey, BSc, MSc
- Alice Broome, BSc
- Robert Coope, BSc
- Joan Cottrell, BSc, PhD
- Steven Hendry, BSc, PhD
- Jason Hubert, BA, MSc, DPhil, MICFor
- Darren Moseley, BSc, PhD
- Duncan Ray, BSc
- Sam Samuel, BSc, PhD
- Roz Shields
- Louise Sing, BA, MSc
- Mike Smith, BSc
- Shirley Spencer (also with FMD and TSU)
- Tytti Vanhalla, BSc, MSc, PhD
- Georgios Xenakis BSc, MSc, PhD
- Amy Eycott, BSc, PhD
- Mark Ferryman
- Robin Gill, BSc, MSc, PhD
- Philip Handley, BSc, MSc
- Ralph Harmer, BSc, PhD
- Andrea Kiewitt, BSc, MSc, Dipl-Biol
- Brenda Mayle, MSc
- Shirley Stephens
- Roger Trout, BA, PhD
- Kevin Watts, BSc, PhD

Environmental and Human Sciences Division

- Professor Andy Moffat, BSc, PhD, DSc, *Head of Division*
- Lorraine Adams, BSc
- Nadia Barsoum, BSc, PhD
- Sue Benham, BSc
- François Bochereau, BSc, MSc
- Samantha Broadmeadow, BSc, MSc
- Andy Brunt
- Claudia Carter, BSc, MSc
- Sylvia Cowdry
- Peter Crow, BSc, MSc
- Norman Dandy, BSc, MA, PhD
- Kieron Doick, BSc, MRes, PhD
- Tony Hutchings, MSc
- Lynn Jordan
- Anna Lawrence, BA, MSc, PhD
- Vicki Lawrence
- Alberto Morales, BSc, PhD
- James Morison, BSc, PhD
- Jake Morris, MA, PhD
- Jacqui Neal
- Tom Nisbet, BSc, PhD
- Liz O'Brien, BSc, PhD
- Richard Pilgrim, BSc
- Rona Pitman, BSc, PhD
- Danielle Sinnett, BSc, MSc
- Elena Vanguelova, BSc, MSc, PhD
- Matthew Wilkinson, BSc, MSc
- Jeremy Wingate, BSc, MSc
- Sirwan Yamulki, BSc, MSc, PhD
- David Edwards, BSc, MSc, MSc, PhD
- Mariella Marzano, BA, MA, PhD
- Vadims Sarajevs, MSc, MSc, PhD
- Nadeem Shah, BSc, MSc, PhD
- Gregory Valatin, MA, MPhil, PhD
- Bianca Ambrose-Oji, BSc, MSc, PhD
- Huw Thomas, BSc, MSc

Forest Management Division

Incorporating Technical Development

- Bill Mason, BA, BSc, DSc, MICFor, *Head of Division*
- Cathleen Baldwin
- Colin Edwards, BSc, MRes
- Trevor Fenning, BSc, PhD
- John Fonweban, BSc, MSc, PhD
- Professor Barry Gardiner, BSc, PhD, FRMetS
- Sophie Hale, BSc, PhD
- Alan Harrison, BSc, MSc
- Madge Holmes
- Steve Lee, BSc, PhD, MICFor
- Elspeth MacDonald, BSc, MSc
- Colin McEvoy, BA
- Shaun Mochan, MSc
- Bruce Nicoll, BSc, PhD
- Margaret O'Donnell
- Steven Osborne, BSc (also with TSU)
- Mike Perks, BSc, MSc, PhD
- Stefania Pizzirani, BA, MSc
- Shirley Spencer (also with ED and TSU)
- Rob Sykes
- Peter Gosling, BSc, PhD
- Richard Jinks, BSc, PhD
- Gary Kerr, BSc, PhD, FICFor, CEnv
- Shelagh McCartan, BSc, MSc, PhD
- Matt Parratt, BSc
- Victoria Stokes, BSc, MSc, PhD
- Christine Woods, BA
- Ian Willoughby, BSc, MBA, FICFor

Technical Development

Ae, Scotland

- Duncan Ireland, BSc
- Bill J. Jones
- Ian Murgatroyd
- Joyce Rammell, BSc
- Colin Saunders
- Jean Saunders

Delamere

- Stephanie Roux, MSc

Wales

- David Jones, EngTech, AMIAgrE
- Finlay McAllister, BA, BSc

KEY: ■ Alice Holt ■ Northern Research Station ● Technical Development Office ● Field Station

Tree Health Division

- Joan Webber, BSc, PhD
  Acting Head of Division
- Professor Clive Brasier,
  BSc, PhD, DSc, Research Fellow
- Anna Brown, BSc, PhD
- Sandra Denman, BSc, MSc, PhD
- Daegan Inward, BSc, MSc, PhD
- Andrew Jeeves
- Martin Jukes, Cbiol, MIBiol
- Susan Kirk
- David Rose, BA
- Joan Rose
- Claire Sabin, BA
- Nigel Straw, BSc, PhD, FRES
- Christine Tilbury, BSc
- Kath Tubby, MSc, DPhil, MA (Oxon)
- David Wainhouse,
  BSc, MSc, PhD, FRES
- David Williams, BSc, PhD
- Sarah Green, BSc, PhD
- Stuart Heritage, MBA, CBiol, MIBiol
- Grace MacAskill
- Roger Moore, BSc, PhD
- Heather Steele, BSc

Field Stations

Technical Services Unit

- Janet Dutch, BSc, PhD,
  Head of Unit
- Esther Ker

NRS Engineering Services

- David Brooks,
  Head of Engineering Services
- James Nicholl
- John Strachan

Inver

- Nick Evans (currently on
  secondment with FE Scotland)
- Andrew Kennedy, BSc
- Bill Rayner
- Pauline Simson, BSc

Ae and Bush Nursery

- Dave Watterson,
  Head of Stations

Ae

- James Duff
- Patrick Home Robertson, BSc
- Harry Watson
- James White

Bush Nursery

- David Clark, *Nursery Manager*
- John Armstrong
- Colin Gordon
- Hamish Howell

Newton and Lairg

- Alistair MacLeod, *Head of Stations*

Newton

- Hazel Andrew
- Sam Catchpole, BSc
- Julie Gardiner, BSc
- Philip James, BSc
- Martin Mackinnon, BSc
- Fraser McBirnie
- Stuart McBirnie
- Stephen O'Kane
- Gary Servant, BSc
- Colin Smart
- Will Thompson, BSc

Lairg

- Alexander Bowran
- Calum Murray
- Duncan Williams

Alice Holt and Exeter

- Mark Oram, BSc, MSc, *Head of Station*
- Jamie Awdry
- Bob Bellis
- Sue Bellis
- Tony Bright
- Steve Coventry
- Kate Harris
- Ian Keywood
- Jim Page
- Bill Page

Alice Holt Workshop

- Jon Davey
- Clive Muller

Exeter

- Alan Ockenden
- Anthony Reeves
- Barnaby Wylder

Fineshade, Thetford and Wykeham

- Liz Richardson, *Head of Stations*

Thetford

- John Lakey
- Paul Turner
- Alistair Whybrow, BSc
- Steven Whall

Wykeham

- Lee Cooper
- Nicola Corney
- Patricia Jackson
- William Riddick
- Jake Thompson, BSc

Shobdon and Talybont

- Nick Fielding, *Head of Stations*

Shobdon

- Sharon O'Hare
- Andrew Price, BSc
  (seconded to CE's Office)
- John Price

Talybont

- Lyn Ackroyd
- Dai Evans
- Ben Griffin, BSc
  (on special unpaid leave)
- Steve Howells
- Richard Keddle
- Michal Maniakowski, BSc
- Tony Price
- Tyrone Waldron

KEY: ■ Alice Holt ■ Northern Research Station ● Technical Development Office ● Field Station

PhD students linked with Forest Research as at 31 March 2009

Tom Adams
University of Edinburgh
Modelling complexity in native pinewoods

Gail Atkinson
University of Surrey
Land regeneration for greenspace establishment: balancing engineering, environmental and social considerations

Dave Auty
University of Aberdeen
Scots pine timber quality in Scotland

Matt Aylott
University of Southampton
Modelling climate change impacts on the availability of short rotation coppice

Kate Beauchamp
University of Edinburgh
The biology of heartwood formation and its influence on timber quality

Sophie Bertin
University of Edinburgh
Physiological ecology of understorey trees in alternative management systems

Freia Bladon
University of Ulster
The impact of defoliating insects in a changing forest environment

Vanesa Castan Broto
University of Surrey
Lay perspectives in coal ash pollution

Jo Clark
University of Wales, Bangor
Provenance selection for climate change

Filipa Cox
Imperial College London
Are there links between tree health and ectomycorrhizal fungal communities under changing environmental conditions?

Theresa Huston
University of Exeter
Soil microbial population dynamics and function, and soil carbon fluxes within forest systems as influenced by climate change and increased atmospheric CO_2

Clare Jones
University of Liverpool
An investigation into Holocene stand-scale forest dynamics of British woodlands

Stuart Kennedy
University of Aberdeen
Determining the genetic heritability of wood properties of Sitka spruce critical to timber strength

Hamish Mackintosh
University of Edinburgh
Developing the silviculture of continuous cover forestry: using the experience and data collected from the Glentress trial area

David Messenger
University of Edinburgh
Effect of UVB radiation on leaf litter decomposition

Helen Murray
University of Glasgow
The impact of the Whitelee Wind Farm development on the export of carbon and nutrients to catchment runoff

Philippa Reid
University of York
The role of biotic interactions in determining species' responses to climate warming

Sabrina Reignoux
University of Edinburgh
Molecular ecology of *Lophodermium* spp. on Scots pine

Matti Salmela
University of Edinburgh
Adaptive variation in natural populations of Scots pine in Scotland

Helen Sneath
University of Surrey
The sustainability of charcoal as an ameliorant in soil remediation

Claire Stevenson
University of Cumbria
Modelling ecological networks and dispersal in the grey squirrel *Sciurus Carolinensis*

James Stratford
University of Surrey
Use of charcoal for environmental improvements

Eleanor Swain
University of Newcastle
Carbon turnover in forest and grassland soils – will global warming turn carbon sinks into sources?

Armand Tene
University of Dublin
Tree species adaptation to climate change

Emma Thorpe
University of Essex
Impact of nitrogen deposition on microbial diversity and function in relation to nitrogen/carbon cycling in different forest soils

Claire Twiddle
University of Exeter
Modelling the vegetation history of Inshriach Forest, Cairngorms

Leena Vihermaa
University of Glasgow
Tree growth influences on wood properties

Naomi Vokes
University of York
The role of litter priming in deciduous forest soil carbon dynamics

Kirsten Wright
University of Reading
Investigation into best practice for the design and management of successful engineered wetland habitats on brownfield land

Accounts for the year ended 31 March 2009

Accounts
for the year ended 31 March 2009

Annual Report for the year ended 31 March 2009

1. Basis of accounts

These accounts are prepared in accordance with a direction given by HM Treasury in pursuance of section 7 of the Government Resources and Accounts Act 2000.

Management Commentary

2. Status

Forest Research became an Executive Agency of the Forestry Commission on 1 April 1997. It undertakes the major part of the Commission's research and development programmes as well as providing survey, monitoring and scientific services.

Forest Research remains part of the Forestry Commission, which is a cross border Government Department responsible for forestry throughout Great Britain. The relationship between Forest Research, the Forestry Commissioners and Forestry Ministers is described in the Framework Document, revised and published in September 2003.

Under the Framework Document, Forest Research is funded from the sale of its services to both the Forestry Commission and external customers. Any annual surplus or deficit is counted in the Forestry Commission's net funding requirement.

With effect from 1 April 2008, the Forestry Commission's Estimate is incorporated as a seperate Request for Resource (RfR) within the Defra Estimate. The Forestry Commission Estimate comprises sub-heads A and B with the net funding of Forest Research, as a Great Britain entity, included in sub-head B.

3. Strategy

The strategic aims and objectives of the Agency have been set to assist the Forestry Commission achieve its GB objective to take the lead in development and promotion of sustainable forest management and to support its achievement nationally.

These are discussed in detail in the Agency's corporate plan, which is available on the Forestry Commission website and the Forest Research website.

4. Relationships with stakeholders

As most aspects of forestry are devolved activities, strong relationships between the wider Forestry Commission (FC) and the devolved administrations are critical. Summer 2005 saw the launch of FC's Science and Innovation Strategy, with an increased focus on the role of the FC National Offices and the Northern Irish Forestry Service to shape the research agenda and to disseminate results, via the creation of Programme Advisory Groups (PAGs) involving country stakeholders. The Agency also appointed three Research Liaison Officers, to support the process of research commissioning and dissemination on an ongoing basis.

As an applied research institute, the Agency's relationships with the forestry and land management sectors are very important. The Agency maintains effective contact with these sectors through direct work for, or dialogue and project partnership with, individuals, companies, trade associations and professional bodies. We also provide an annual suite of targeted seminars, workshops and continuing professional development (CPD) events and host stands at major events such as the Royal Welsh Show. The launch of our newsletter ***FR News*** during the year has been well received by external stakeholders and typifies our outward facing approach to communications.

5. Aims and objectives

The aim of Forest Research is set out in the Framework Document. It is to support and enhance forestry and its role in sustainable development, by providing high quality research and development in a well-run organisation. The objectives of Forest Research are listed on page 8 in the main body of the Annual Report and Accounts.

Current and future development and performance

6. Operating review

The need for scientific evidence to support the development and delivery of country-specific forestry policies is increasing, for example in the area of forest and soil carbon management, and requires FR to be flexible and responsive in the research advice and services it provides. This link to policy and operational needs has been strengthened during the year by changing the structure and composition of the PAGs, the system by which the FC collectively specifies its research needs. FR staff now provide contract proposals for all FC-funded programmes annually and these are reviewed, modified and approved by the PAGs each Autumn. This ensures that the programme of research undertaken by FR is aligned very closely to the developing policy agendas in each country and their associated operational needs. The guidance we published during the year on stump harvesting for renewable energy production is a good example of the applied science we provide which supports both policy objectives and the development of industrial best practice.

As a result of a review, the Forestry Commission decided to consolidate its inventory and forecasting activities and created a new unit within the Department called Inventory Forecasting & Operational Support (IFOS). The creation of this unit resulted in the formal transfer of 11 staff from FR to the Department with effect from 1 April 2009.

Given the disappointing financial outturn in 2007–08, we carried out an organisation-wide efficiency and delivery review during the year and this recommended specific cost savings, including the need to restructure and re-profile our scientific expertise. As a result, FR secured support to run a voluntary severance scheme and agreed terms with 16 applicants at a total cost of £1.2 million. This reduction in staff numbers will result in considerable annual salary savings, and allow FR to recruit in areas of research where there is growing demand.

During the year we also reorganised FR, to reflect market needs, into an Operations Unit and three inter-linking centres:

- The Centre for Forestry and Climate Change
- The Centre for Forest Resources and Management
- The Centre for Human and Ecological Sciences

All staff were transferred to one of these three centres or the Operations Unit during the year and the new structure was officially launched on 2 April 2009.

7. Financial review

Forest Research produced a net operating deficit of **£128,000** on its Operating Cost Statement, excluding exceptional items and the notional cost of capital, an improvement over the net operating deficit of £887,000 in 2007–08. A comparison of income and expenditure with the previous year's results shows that:

- staff costs increased by £240,000 (2.5%), following a Pay Award worth 4.0% with effect from 1 October 2008
- other management costs increased by £331,000 (13.6%), mainly as a result of PRINCE project management training, losses on disposals of assets (removal of roads and car parks from the asset register) and higher depreciation charges (resulting from the revaluation and re-lifing of buildings)
- materials and services costs decreased by £593,000 (17.0%), primarily resulting from one project which used a high level of materials and supplies being completed, employment of fewer contractors to meet contractual commitments and project partners' costs not being accounted for as services
- income from Forestry Commission customers increased by £323,000 (2.5%), including an additional £200,000 from Corporate and Forestry Support
- income from external customers increased by £414,000 (27.1%). The 2007–08 figure was much lower than previous years and this increase is a result of improved financial and management information systems and reporting, and an increased level of work undertaken for external customers
- a provision of £1,220,000 was made for early departure costs of staff committed to leave in the restructuring of Forest Research during 2009–10
- the notional cost of capital decreased by £37,000 (7.2%), as a result of downward revaluation of fixed assets and a provision for early departure costs.

Excluding early departure costs from the 2008–09 results, cost recovery would have been **96.2%**. However, the net deficit for the year after the cost of capital charge of £474,000, early departure costs and depreciation was £1,822,000, representing a cost recovery rate of 89.4%, compared with 91.3% in 2007–08.

After adjusting the total deficit for items not involving the movement of cash and for capital expenditure, bank account movements and income, the net cash inflow for the year was £671,000, which was paid to the Forestry Commission. This compared with a cash outflow of £392,000 in 2007–08.

Additions to fixed assets in the year were £268,000. Forest Research restricted capital expenditure for the year to essential items only as a way of minimising a budget deficit, but plans to increase capital expenditure in future years.

8. Financial objective – Key Performance Indicators (KPIs)

Forest Research's primary financial objective set out in the Framework Document is to recover the full economic costs, including cost of capital, of its operations from the sale of services to customers. In 2008–09 the recovery rate was 96.2%, before allowing for early departure costs and 89.4% once these exceptional items were included.

Performance against other operational, scientific and financial KPIs is reported in the main body of the Annual Report and Accounts. FR achieved £1.9m of income from non-FC customers against the KPI target of £2.4m.

9. Events since the balance sheet date

There were no significant post-balance sheet events to record.

10. The future

FR published a Development Strategy in September 2006, however, the evidence base requirements and scientific needs of our key clients have changed significantly since then, for example, climate change has moved up the

agenda and there is an urgent need for FR to review both its business development and scientific strategies. Therefore in 2009–10 FR will develop and publish a series of inter-linking science, business development and strategic investment plans. It is our intention for these plans to provide a comprehensive blueprint for FR's future direction and development over the coming five years.

As part of its corporate plan objectives for 2009–10, FR will officially launch its three new research centres and develop their profiles through a series of targeted marketing events. FR will also continue to participate and play its part in the Forestry Commission's corporate programmes, in particular Business Sustainability, Investors in People and Equality and Diversity.

We also intend to place considerable emphasis on staff development during 2009–10, in particular through our participation in the Forestry Commission's Management Development Programme and through an in-house programme of events for our science leaders and managers.

11. Supplier payment policy

Forest Research observes the principles of the Late Payment of Commercial Debts (Interest) Act 1998. Unless otherwise stated in the contract, we aim to pay within 30 days from the receipt of goods and services, or the presentation of a valid invoice, whichever is the later. An analysis for 2008–09 indicates that 100% of payments to suppliers, including those made using the Government Procurement Card, were paid within the due date. Arrangements for handling complaints on payment performance are notified to suppliers on orders. No interest was paid under the Late Payment of Commercial Debts (Interest) Act 1998.

In October 2008, the Prime Minister committed Government organisations to improving the cash flow position of its suppliers by settling their accounts within 10 days wherever possible. The Forestry Commission recognises its role in supporting local, rural economies and has a proven record of meeting its contractual payment terms. It also works closely with its local suppliers to ensure prompt payment of debt. Management recognised that the general economic climate could potentially have a detrimental effect on small and medium enterprises and considered whether further action could be taken to improve cash flows.

The Forestry Commission concluded that no special systems solutions would be required. Local offices have a very close working relationship with their suppliers. For the most part, local suppliers have ongoing dialogues with their Forestry Commission contract managers about business issues including cash flows. Through these, small/medium suppliers already had processes in place that enabled prompt payments. It was generally believed that suppliers who faced hardship would discuss the matter with contract managers and agreed solutions developed. While the above would not apply directly to larger companies, the Forestry Commission believed that special measures would not be required because of existing levels of prompt payment.

12. Employment policies

Forest Research adheres to the Forestry Commission's employment policy and values and respects its staff by treating each member with respect and trust, and in doing so recognises that each person is different and can make a unique contribution to the work. The purpose of the Forestry Commission's employment policy is to demonstrate that it is an equal opportunity employer and the aim is to be fair to everybody. To do this the Forestry Commission ensures that no eligible job applicant or employee receives less favourable treatment on the grounds of their gender, or gender re-assignment, ethnic origin, disability, age, nationality, national origin, sexual orientation, marital status, religion and religious or philosophical belief, social class or offending background.

All employees, whether part-time, full-time or temporary, will be treated fairly and equally. Selection for employment, promotion or training or any other benefit will be on the basis of aptitude and ability. All employees will be helped and encouraged to develop their full potential and the talents and resources of the workforce will be fully utilised to maximise the efficiency of the organisation. No person shall be disadvantaged by conditions or requirements which cannot be shown to be justifiable.

The Forestry Commission also follows good employer practices aimed at ensuring that all staff work in an environment free from both illegal and unfair discrimination and harassment. Consolidated statements of the Commission's obligations with regard to equality of opportunity and diversity are shown in the Staff Handbook. Full details of these initiatives arising from our policies are also set out on the Human Resources intranet site.

The Forestry Commission will monitor the success of its policies by:

- Collecting and analysing data as appropriate.
- Regularly reviewing procedures (recruitment, performance management, promotion and pay) to ensure that they are free of unfair discrimination.
- Reporting the results of equality and diversity monitoring to the Human Resources Management Sub-Committee on an annual basis.
- Liaising closely with Cabinet Office and other Government Departments to ensure that we are keeping abreast of all changes in legislation and other developments.

Further information on the employment of persons with disabilities, the provision of information to, and consultation with, employees, and the promotion of equal opportunities is available on request from the Human Resources unit of the Forestry Commission.

13. Sickness absence

We have one common absence management policy which covers the whole of the organisation and provides a consistent framework approach to management. The policy is underpinned by an externally provided occupational health service and an internal employee support programme which is available 24 hours a day. In 2008–09, the average number of working days lost to sickness absence was 5.54 per employee, which compares favourably with the average of 6.25 for the Forestry Commission.

14. Management

The Department for Environment, Food and Rural Affairs Ministers who had responsibility for the Forestry Commission, including Forest Research, during the year were:

Rt. Hon. Hilary Benn MP	*Secretary of State*
Joan Ruddock MP	*Parliamentary Under-Secretary of State (Climate Change, Biodiversity and Waste) (until October 2008)*
Huw Irranca-Davies MP	*Parliamentary Under-Secretary of State (Natural and Marine Environment, Wildlife and Rural Affairs) (from October 2008)*

Members of the Executive Board of Forest Research during the year were:

James Pendlebury	*Chief Executive (from 16 June 2008)*
Peter Freer-Smith	*Research Director (Acting Chief Executive until 15 June 2008)*
Ken Charles*	*Head of Human Resources and Administration*
Sandra Smith*	*Finance Director*
Bill Mason*	*Head of Forest Management Division*
Helen Mckay	*Head of Biometrics, Surveys and Statistics Division*

Hugh Evans*	*Head of Tree Health Division*
Chris Quine	*Head of Ecology Division*
Andy Moffat	*Head of Environmental and Human Sciences Division (and Acting Research Director until 15 June 2008)*
Xanthe Christophers*	*Communications Director*
Janet Dutch*	*Head of Technical Services Unit*
Alison Melvin*	*Commercial Director*
Hugh Williams	*Acting Director of Communications (from 1 September 2008) then Head of Operations (from 23 February 2009)*
Wilma Harper	*Head of Corporate and Forestry Support*

* The Executive Board was restructured during 2008–09 and these staff ceased to be Board members from 6 November 2008.

The Chief Executive is appointed following public advertising of the post. The term of the appointment, and provision for its termination, are governed by the Civil Service Commissioners' Recruitment Code.

Remuneration of board members who hold senior staff group posts is determined by the Forestry Commission's Senior Pay Committee in accordance with guidelines prescribed by the Cabinet Office. Other board members' remuneration is determined by the standard processes set out in the Forestry Commission's pay and grading system.

Further details on remuneration are set out in the Remuneration Report (page 48).

15. Pensions

Information on pensions is contained in the Remuneration Report and accounting policy note 1.14.

16. Personal data related incidents

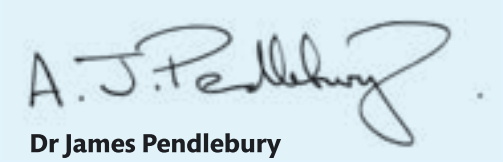
There were no protected personal data related incidents reported for Forest Research in 2008–09 or previous financial years. Forest Research will continue to monitor and assess its information risks in order to identify and address any weaknesses and ensure continued improvement of its systems. Further information on the handling of information risk is contained in the Statement on Internal Control.

17. Auditors

These accounts are prepared in accordance with a direction given by the Treasury in pursuance of Section 7 of the Government Resources and Accounts Act 2000. They are audited by the Comptroller and Auditor General. The fee for statutory audit services in respect of these accounts was £28,000. No further assurance or other non-audit services were provided.

18. Disclosure of audit information to the auditors

So far as I am aware, there is no relevant audit information of which the Forest Research auditors are unaware. I have taken all the steps that I ought to have taken to make myself aware of any relevant audit information and to establish that the Forest Research auditors are aware of that information.



Dr James Pendlebury
Chief Executive and Agency Accounting Officer
8 July 2009

Remuneration Report

Remuneration policy
Remuneration of board members who hold senior staff group posts is determined by the Forestry Commission's Senior Pay Committee in accordance with guidelines prescribed by the Cabinet Office. Details of membership of the Pay Committee are provided in the Remuneration Report of FC Great Britain/England. Other board members' remuneration is determined by the standard processes set out in the Forestry Commission's pay and grading system.

Employment contracts
The Chief Executive is appointed following public advertising of the post. The term of the appointment, and provision for its termination, are governed by the Civil Service Commissioners' Recruitment Code. Dr James Pendlebury was appointed as Chief Executive with effect from 16 June 2008.

Civil Service appointments are made in accordance with the Civil Service Commissioners' Recruitment Code, which requires appointment to be on merit on the basis of fair and open competition but also includes the circumstances when appointments may otherwise be made.

All senior staff covered in this report hold appointments which are open-ended until they reach the normal retiring age. Early termination, other than for misconduct, would result in the individual receiving compensation as set out in the Civil Service Compensation Scheme.

The performance of senior staff is monitored and reviewed through the appropriate Performance Management System (PMS) of the Forestry Commission. No element of remuneration is specifically subject to performance conditions although pay progression can be affected and bonuses, if awarded, are based on performance.

Further information about the work of the Civil Service Commissioners can be found at **www.civilservicecommissioners.gov.uk**

Salary and pension entitlements (information subject to audit)
The salary and pension entitlements of the members of the Forest Research Executive Board were as follows.

Name	**2008–09**		2007–08	
	Salary £000	Benefits in kind (to the nearest £100)	Salary £000	Benefits in kind (to the nearest £100)
James Pendlebury (from 16 June 2008)	55–60 (full year equivalent 70–75)	900	00–00	–
Peter Freer-Smith	75–80	3,900	75–80	3,700
Ken Charles (to 6 November 2008)	30–35 (full year equivalent 50–55)	–	45–50	–
Sandra Smith (to 6 November 2008)	25–30 (full year equivalent 40–45)	–	10–15 (full year equivalent 40–45)	–
Bill Mason (to 6 November 2008)	35–40 (full year equivalent 55–60)	–	55–60	–
Hugh Williams (from 1 September 2008)	25–30 (full year equivalent 45–50)	–	00–00	–
Helen Mckay	55–60	–	50–55	–
Hugh Evans (to 6 November 2008)	35–40 (full year equivalent 60–65)	1,200	60–65	1,500
Chris Quine	60–65	–	55–60	–
Andy Moffat	60–65	–	60–65	–
Xanthe Christophers (to 6 November 2008)	20–25 (full year equivalent 40–45)	–	45–50	–
Janet Dutch (to 6 November 2008)	20–25 (full year equivalent 35–40)	–	30–35	–
Alison Melvin (to 6 November 2008)	20–25 (full year equivalent 35–40)	–	35–40	–

The salary and pension entitlements of Wilma Harper, an Executive Board member, are borne and disclosed in the Forestry Commission GB/England Annual Report and Accounts 2008–09 as she is Head of Corporate Forestry and Support, Forestry Commission.

Salary
'Salary' includes basic salary, performance pay or bonus, overtime and any allowances subject to UK taxation.

Benefits in kind
The monetary value of benefits in kind covers any benefits provided by the employer and treated by the HM Revenue and Customs as taxable income. They are in respect of the Car Provision for Employees Scheme.

Pension benefits 2008–09 (information subject to audit)

Name	Accrued pension at age 60 at 31/3/09 and related lump sum	Real increase in pension and related lump sum	CETV at 31 March 2009	CETV at 31 March 2008**	Real increase (decrease) in CETV	Employer contribution to partnership pension account
	£000	£000	£000	£000	£000	nearest £100
James Pendlebury	5–10 plus 20–25 lump sum	0–2.5 plus 5–7.5 lump sum	116	78	30	–
Peter Freer-Smith	20–25 plus 70–75 lump sum	0–2.5 plus 2.5–5.0 lump sum	493	442	16	–
Ken Charles*	20–25 plus 70–75 lump sum	0–2.5 plus 0–2.5 lump sum	547	515	15	–
Bill Mason*	20–25 plus 70–75 lump sum	0–2.5 plus 2.5–5.0 lump sum	555	504	20	–
Hugh Williams	5–10 plus 5–10 lump sum	0–2.5 plus 0–2.5 lump sum	98	71	16	–
Hugh Evans*	25–30 plus 85–90 lump sum	0–2.5 plus 0–2.5 lump sum	667	605	13	–
Chris Quine	20–25 plus 60–65 lump sum	0–2.5 plus 2.5–5.0 lump sum	362	316	17	–
Andy Moffat	20–25 plus 65–70 lump sum	0–2.5 plus 0–2.5 lump sum	484	437	11	–
Xanthe Christophers*	0–5	0–2.5	49	34	10	–
Helen McKay	15–20 plus 50–55 lump sum	0–2.5 plus 0–2.5 lump sum	380	348	(4)	–
Sandra Smith*	0–5	0–2.5	15	3	10	–
Janet Dutch*	5–10 plus 20–25 lump sum	0–2.5 plus 0–2.5 lump sum	128	112	6	–
Alison Melvin*	0–5 plus 10–15 lump sum	0–2.5 plus 0–2.5 lump sum	73	58	9	–

* Left the Executive Board during 2008–09

** The figure may be different from the closing balance in last year's accounts. This is due to the Cash Equivalent Transfer Value (CETV) factors being updated to comply with The Occupational Pension Scheme (Transfer Values) (Amendment) Regulations 2008.

Civil Service Pensions

Pension benefits are provided through the Civil Service pension arrangements. From 30 July 2007, civil servants may be in one of four defined benefit schemes: either a 'final salary' scheme (classic, premium or classic plus), or a 'whole career' scheme (nuvos). These statutory arrangements are unfunded with the cost of benefits met by monies voted by Parliament each year. Pensions payable under classic, premium, classic plus and nuvos are increased annually in line with changes in the Retail Prices Index (RPI). Members joining from October 2002 may opt for the appropriate defined benefit arrangement or a good quality 'money purchase' stakeholder arrangement with a significant employer contribution (partnership pension account).

Employee contributions are set at the rate of 1.5% of pensionable earnings for classic and 3.5% for premium, classic plus and nuvos. Benefits in classic accrue at the rate of 1/80th of final pensionable earnings for each year of service. In addition, a lump sum equivalent to three years' pension is payable on retirement. For premium, benefits accrue at the rate of 1/60th of final pensionable earnings for each year of service. Unlike classic, there is no automatic lump sum (but members may give up (commute) some of their pension to provide a lump sum). Classic plus is essentially a hybrid with benefits in respect of service before 1 October 2002 calculated broadly as for classic and benefits for service from October 2002 calculated as in premium. In nuvos a member builds up a pension based on his pensionable earnings during their period of scheme membership. At the end of the scheme year (31 March) the member's earned pension account is credited with 2.30% of their pensionable earnings in that scheme year and the accrued pension is uprated in line with RPI. In all cases members may opt to give up (commute) pension for lump sum up to the limits set by the Finance Act 2004.

The partnership pension account is a stakeholder pension arrangement. The employer makes a basic contribution of between 3% and 12.5% (depending on the age of the member) into a stakeholder pension product chosen by the employee from a panel of three providers. The employee does not have to contribute but where they do make contributions, the employer will match these up to a limit of 3% of pensionable salary (in addition to the employer's basic contribution). Employers also contribute a further 0.8% of pensionable salary to cover the cost of centrally provided risk benefit cover (death in service and ill health retirement).

The accrued pension quoted is the pension the member is entitled to receive when they reach pension age, or immediately on ceasing to be an active member of the scheme if they are already at or over pension age. Pension age is 60 for members of classic, premium and classic plus and 65 for members of nuvos.

Further details about the Principal Civil Service Pension Scheme can be found at the website **www.civilservice-pensions.gov.uk**

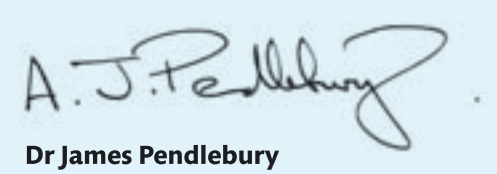
Cash Equivalent Transfer Values

A Cash Equivalent Transfer Value (CETV) is the actuarially assessed capitalised value of the pension scheme benefits accrued by a member at a particular point in time. The benefits valued are the member's accrued benefits and any contingent spouse's pension payable from the scheme. A CETV is a payment made by a pension scheme or arrangement to secure pension benefits in another pension scheme or arrangement when the member leaves a scheme and chooses to transfer the benefits accrued in their former scheme. The pension figures shown relate to the benefits that the individual has accrued as a consequence of their total membership of the pension scheme, not just their service in a senior capacity to which disclosure applies. The figures include the value of any pension benefit in another scheme or arrangement which the individual has transferred to the Civil Service pension arrangements. They also include any additional pension benefit accrued to the member as a result of their purchasing additional years of pension service in the scheme at

their own cost. CETVs are calculated within the guidelines and framework prescribed by the Institute and Faculty of Actuaries.

Real increase in CETV

This reflects the increase in CETV effectively funded by the employer. It takes account of the increase in accrued pension due to inflation, contributions paid by the employee (including the value of any benefits transferred from another pension scheme or arrangement) and uses common market valuation factors for the start and end of the period.



Dr James Pendlebury
Chief Executive and Agency Accounting Officer
8 July 2009

Statement of Accounting Officer's Responsibilities

Under Section 7 of the Government Resources and Accounts Act 2000 the Treasury has directed the Forestry Commission to prepare for each financial year a statement of accounts for Forest Research in the form and on the basis set out in the Accounts Direction. The accounts are prepared on an accruals basis and must give a true and fair view of the Forest Research state of affairs at the year-end and of its income and expenditure, recognised gains and losses and cash flows for the financial year.

In preparing the accounts the Forestry Commission is required to comply with the requirements of the *Government Financial Reporting Manual* and in particular to:

- observe the Accounts Direction issued by HM Treasury, including the relevant accounting and disclosure requirements, and apply suitable accounting policies on a consistent basis;
- make judgements and estimates on a reasonable basis;
- state whether applicable accounting standards, as set out in the *Government Financial Reporting Manual*, have been followed, and disclose and explain any material departures in the accounts;
- prepare the accounts on the going concern basis.

The Director General of the Forestry Commission, as Accounting Officer for the Forestry Commission, has designated the Chief Executive of Forest Research as the Accounting Officer for the Agency. His responsibilities as Agency Accounting Officer (including responsibility for the propriety and regularity of the public finances for which an Accounting Officer is answerable, for keeping proper records, and for safeguarding the Agency's assets), are set out in *Managing Public Money* published by the Treasury.

Statement on Internal Control

1. Scope of responsibility

I was appointed Agency Accounting Officer with effect from 16 June 2008. Prior to this date the Agency Accounting Officer was Prof Peter Freer-Smith. In making this statement I am reliant upon the commitment and discipline he exercised in carrying out the role of Accounting Officer until my appointment and in assurances that he has provided to me.

As Agency Accounting Officer, I have responsibility for maintaining a sound system of internal control that supports the achievement of Forest Research policies, aims and objectives, whilst safeguarding the public funds and departmental assets for which I am personally responsible, in accordance with the responsibilities assigned to me in HM Treasury's *Managing Public Money*.

The Chief Executive is a member of the Forestry Commission's (FC's) Executive Board and is responsible, normally through the Director General, to the Forestry Commissioners for the management of the Agency. The Chief Executive has a right of direct access to the Commissioners, and to the relevant Minister, and a right to meet them at least once a year. As Agency Accounting Officer, I am responsible for the Agency's accounts and financial procedures, and for the proper, effective and efficient use of resources provided to the Agency within the terms of the Framework Document and in pursuit of the agreed objectives and targets.

In particular, I am responsible for:

- preparing the Agency's Corporate Plan and achieving the Agency's targets;
- the appointment and organisation of the Agency's staff, and deployment of other resources to achieve the aims and objectives;
- maintaining financial and management information systems to assist in the monitoring and control of performance;
- preparing and submitting the Agency's Annual Report and Accounts;
- chairing an Agency Executive Board (EB) comprising senior managers within the Agency and the FC's Head of Corporate and Forestry Support.

As part of their Accounting Officer responsibilities, the Director General and Chief Executive are liable to be invited to appear before the Committee of Public Accounts (PAC). It will be for Ministers to decide who should represent them at other Parliamentary Committee hearings. In practice, where a Committee's interest is confined to the day-to-day operations of the Agency, Ministers will normally regard the Chief Executive as the person best placed to appear on their behalf.

2. The purpose of the system of internal control

The system of internal control is designed to manage risk to a reasonable level rather than to eliminate all risk of failure to achieve policies, aims and objectives. It can therefore only provide reasonable and not absolute assurance of effectiveness. The system of internal control is based on an ongoing process designed to identify and prioritise the risks to the achievement of the Agency's policies, aims and objectives, to evaluate the likelihood of those risks being realised and the impact should they be realised, and to manage them efficiently, effectively and economically. The system of internal control has been in place in the Agency for the year ended 31 March 2009 and up to the date of approval of the Annual Report and Accounts, and accords with Treasury guidance.

3. Capacity to handle risk

The FC's risk management policy statement sets out why risk management is important; the procedures in place to enable the FC to manage risk; and the roles and responsibilities individuals have to ensure risks are managed effectively. The policy was updated in March 2009 and is available to all staff via the intranet.

Each discrete area of the FC is responsible for ensuring the proper management of risks within their own area, including embedding policymaking, planning and delivery.

4. The risk and control framework

The system of internal control incorporates risk management. The system encompasses a number of elements that together facilitate an effective and efficient operation, enabling Forest Research to respond to a variety of operational, financial and commercial risks. It includes regular reporting to the Agency EB, FC EB and, where necessary, to the Board of Commissioners.

Forest Research has established an Audit and Risk Committee (ARC) to support the Accounting Officer and Agency EB in their responsibilities for the effective management of risk, control and governance. Through its work the ARC provides independent assurance on these key activities within the direct control of Forest Research, which supports the achievement of its objectives. The ARC operates in accordance with the principles contained in the Treasury's *Audit Committee Handbook*. The ARC advises the Agency Accounting Officer and EB on:

- the strategic processes for risk, control and governance;
- the Statement on Internal Control;
- the accounting policies, the accounts and the annual report, including the process for review of the accounts prior to submission for audit, levels of error identified, and management's letter(s) of representation to the external auditors;
- the planned activity and results of both internal and external audit;
- adequacy of management response to issues identified by audit activity, including internal audit reports and external audit's management letter;
- assurances relating to the corporate governance requirements; and
- anti-fraud policies and whistle-blowing processes.

The ARC met three times in July and November 2008 and March 2009. In all cases they considered a range of reports from management, and from internal and external audit. The ARC will periodically review its own effectiveness; the first review is scheduled for Autumn 2009.

An FC-wide Risk Management Group (RMG) co-ordinates the continued development of risk management within, and the sharing of best practice across, the FC. The RMG met in March 2009 to approve a revised risk policy document, to update members on developments in each part of the FC and to review progress on business continuity planning.

In the year to 31 March 2009, Forest Research has carried out further work on its risk register. Risk categories and definitions have been updated and a review of the number of significant risks noted in the register, and their associated scoring, has also commenced, linked to the revised organisational structure effective from April 2009. As a result the EB was unable to fully fulfil its responsibilities for managaing risk. As a consequence of this, and other competing priorities, the development of Forest Research's specific Business Continuity Plans (BCPs) has not taken place as intended during 2008–09 and has been deferred to the coming year.

BCPs covering the shared services of Human Resources, Information Services and Finance are still under development. A private risk management consultant has helped to develop framework BCPs but more work is required to link them to the BCPs prepared by countries and agencies and to ensure they meet the needs of customers. The additional work is progressing alongside an FC project to gain certification to the ISO/IEC 27001 standard for Information Security Management Systems.

5. Data handling in Government

The FC has appointed its Director of Finance as the Senior Information Risk Owner (SIRO). The SIRO chairs the Information Security Management Forum (ISMF) which co-ordinates and controls the implementation of information security across the FC. It has met on nine occasions during the year. The work of the ISMF is supported on a day-to-day basis by the Departmental Security Officer (DSO) and the IT Security Officer (ITSO). In determining our approach, the FC has taken the view that, in comparison with other government departments, our information systems hold a relatively small number of records and that the volume of sensitive information requiring a protective marking is relatively low.

The ARC has received updates on information assurance and data handling during the year in accordance with guidance provided by the Cabinet Office. In addition, the SIRO has produced an annual assessment of risk management across the FC. During the year, the FC has progressed the following requirements:

- distributed the guidance publication, *Managing Information Risk*, to Accounting Officers, Chairs of Audit Committees and Board members to assist them in understanding information risk;
- published an Information Charter setting out the standards that people can expect from us when we request or hold their personal information;
- encrypted all existing laptops that connect to the network;
- produced new guidance on marking protective documents;
- established an information asset register and undertaken detailed risk assessments;
- appointed Information Asset Owners (IAOs) for corporate systems.

Despite the progress made in 2008–09, this is still work in progress and there remains a good deal more to be done. In particular, completion of the ISO/IEC 27001 project will demonstrate that the FC has established robust information security policies and related guidance, and educated staff and third parties in information security.

Following development of the National School for Government (NSG) online training package, we are now in a position to make progress on our own training programme. We are currently assessing how to deliver the training requirements set out in the Data Handling Review and the Security Policy Framework using the NSG package as a core tool.

To aid continuous improvement, the Government has introduced the Information Assurance Maturity Model (IAMM). We are undertaking a self-assessment against the Model to include in our annual report to the Cabinet Office. The output from the assessment, in combination with the risk treatments identified from the ISO/IEC 27001 Project, will provide a focus for attention in the forthcoming year.

We have a reporting system to capture all security incidents which are investigated in accordance with Cabinet Office and Information Commissioners' guidance. As reported in the Management Commentary, there have been no reportable incidents of personal information data loss during the year.

6. Review of effectiveness

As Agency Accounting Officer, I have responsibility for reviewing the effectiveness of the system of internal control.

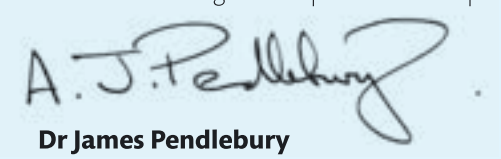
My review is informed by the executive managers within the Agency who have responsibility for the development and maintenance of the internal control framework; the work of the internal auditors, who submit reports to the ARC which include the Head of Internal Audit's independent and objective opinion on the adequacy and effectiveness of the systems of internal control together with recommendations for improvement; and comments made by the external auditors in their management letter and other reports. Plans to address weaknesses and ensure continuous improvement of the system are in place. Areas requiring particular attention during 2009–10 are as follows:

- One of Forest Research's objectives is to breakeven but it has sustained a deficit in both 2007–08 and 2008–09. The Agency has restructured with effect from 2 April 2009 and a number of staff will be departing under an early retirement/severance scheme, which will reduce costs over time with the aim of achieving breakeven position. The main risk to Forest Research is the failure to secure new clients and generate additional external income to enable it to breakeven. Sources of external income will be closely monitored and new opportunities scrutinised to maximise external income.
- In order to manage its business and deliver on its strategy, Forest Research requires effective management information systems. Following an earlier review of information needs, a new time recording system was implemented during 2008–09. Problems concerning data input and output were encountered and took most of the year to resolve. This hampered Forest Research's ability to produce finanical reports at Cost Centre level during the year, however financial control was managed at organisation level. The system has now been signed off as fit for purpose but will be subject to ongoing monitoring during 2009–10. During 2009–10 there will be more emphasis on project-based accounting and reporting to improve financial control and monitoring.
- The current strategic review of the risk register, to reflect the restructuring exercise and new Corporate Plan, will be concluded. The project to develop Forest Research-specific Business Continuity Plans will also be taken forward.
- Forest Research is reliant on Shared Services for many of its Human Resources, Information Services and Finance requirements. The governance and funding of these services, and their links to country and Agency-based support functions, is under review to ensure that they can meet the needs of their customers through an annual review process.
- The FC has found it difficult to meet the timetable for the introduction of International Financial Reporting Standards (IFRS). Despite engaging external accountancy expertise during the year, there were a significant number of matters outstanding at both the Treasury's trigger points for 2008–09. Meeting the trigger points for 2009–10, including the completion of all outstanding matters, is going to be challenging. The work will be planned and monitored closely during 2009–10 to ensure full compliance by the due dates.

The Head of Internal Audit has prepared an annual report and assurance statement to me as the Agency Accounting Officer. The report includes an overall assessment of the adequacy and effectiveness of risk management, control and governance within the Agency. The Director General as Accounting Officer has received a similar report and assurance statement, including any comments specific to the Great Britain core responsibilities. The overall opinion is that internal control within Forest Research has continued to provide assurance that material risks to the achievement of objectives are adequately managed, although some failings have been identified.

7. Significant internal control problems

There were no significant problems to report.



Dr James Pendlebury
Chief Executive and Agency Accounting Officer
8 July 2009

Forest Research Agency

The Certificate and Report of the Comptroller and Auditor General to the House of Commons

I certify that I have audited the financial statement of the Forest Research Agency for the year ended 31 March 2009 under the Government Resources and Accounts Act 2000. These comprise the Operating Cost Statement and Statement of Total Recognised Gains and Losses, the Balance Sheet, the Cashflow Statement and the related notes. These financial statements have been prepared under the accounting policies set out within them. I have also audited the information in the Remuneration Report that is described in that report as having been audited.

Respective responsibilities of the Forestry Commission, the Chief Executive and Auditor
The Forestry Commission and Chief Executive, as Agency Accounting Officer, are responsible for preparing the Annual Report, which includes the Remuneration Report, and the financial statements in accordance with the Government Resources and Accounts Act 2000 and HM Treasury directions made thereunder and for ensuring the regularity of financial transactions. These responsibilities are set out in the Statement of Accounting Officer's Responsibilities.

My responsibility is to audit the financial statements and the part of the Remuneration Report to be audited in accordance with relevant legal and regulatory requirements, and with International Standards on Auditing (UK and Ireland).

I report to you my opinion as to whether the financial statements give a true and fair view and whether the Financial Statements and the part of the Remuneration Report to be audited have been properly prepared in accordance with HM Treasury directions issued under the Government Resources and Accounts Act 2000. I report to you whether, in my opinion, certain information given in the Annual Report, which comprises a management commentary and a review of current and future development and performance, is consistent with the financial statements. I also report whether in all material respects the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them.

In addition, I report to you if the Agency has not kept proper accounting records, if I have not received all the information and explanations I require for my audit, or if information specified by HM Treasury regarding remuneration and other transactions is not disclosed.

I review whether the Statement on Internal Control reflects the Agency's compliance with HM Treasury's guidance, and I report if it does not. I am not required to consider whether this statement covers all risks and controls, or to form an opinion on the effectiveness of the Agency's corporate governance procedures or its risk and control procedures.

I read the other information contained in the Annual Report, which comprises the unaudited part of the Remuneration Report, and consider whether it is consistent with the audited financial statements. I consider the implications for my report if I become aware of any apparent misstatements or material inconsistencies with the financial statements. My responsibilities do not extend to any other information.

Basis of audit opinion

I conducted my audit in accordance with International Standards on Auditing (UK and Ireland) issued by the Auditing Practices Board. My audit includes examination, on a test basis, of evidence relevant to the amounts, disclosures and regularity of financial transactions included in the financial statements and the part of the Remuneration Report to be audited. It also includes an assessment of the significant estimates and judgements made by the Agency and Chief Executive in the preparation of the financial statements, and of whether the accounting policies are most appropriate to the Agency's circumstances, consistently applied and adequately disclosed.

I planned and performed my audit so as to obtain all the information and explanations which I considered necessary in order to provide me with sufficient evidence to give reasonable assurance that the financial statements and the part of the Remuneration Report to be audited are free from material misstatement, whether caused by fraud or error and that, in all material respects, the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them. In forming my opinion I have also evaluated the overall adequacy of the presentation of information in the financial statements and the part of the Remuneration Report to be audited.

Opinions

Audit opinion

In my opinion:

- the financial statements give a true and fair view, in accordance with the Government Resources and Accounts Act 2000 and directions made thereunder by HM Treasury, of the state of the Agency's affairs as at 31 March 2009, and of the net operating cost, recognised gains and losses and cashflows for the year then ended;
- the financial statements and the part of the Remuneration Report to be audited have been properly prepared in accordance with HM Treasury directions issued under the Government Resources and Accounts Act 2000; and
- the information given within the Annual Report, which comprises management commentary and a review of current and future development and performance, is consistent with the financial statements.

Audit opinion on regularity

In my opinion, in all material respects, the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them.

I have no observations to make on these financial statements.

Amyas C E Morse
Comptroller and Auditor General
11 July 2009
National Audit Office
151 Buckingham Palace Road
Victoria
London SW1W 9SS

Operating Cost Statement for the year ended 31 March 2009

	Notes	2008–09 £000	2007–08 £000
Income			
Income from research, development and survey services			
Forestry Commission customers	2	**13,415**	13,092
Non-Forestry Commission Customers			
European Union	3	**450**	65
Other	3	**1,494**	1,465
Total income		**15,359**	14,622
Expenditure			
Staff costs	4	**9,825**	9,585
Other management costs	5	**2,770**	2,439
Materials and services	6	**2,892**	3,485
Total expenditure		**15,487**	15,509
Operating (deficit) before exceptional items		**(128)**	(887)
Early retirement compensation	4	**(1,220)**	–
Operating (deficit) after exceptional items		**(1,348)**	(887)
Notional cost of capital	9	**(474)**	(511)
Net (deficit) for the year		**(1,822)**	(1,398)
Net (deficit) transferred to General Fund		**(1,822)**	(1,398)

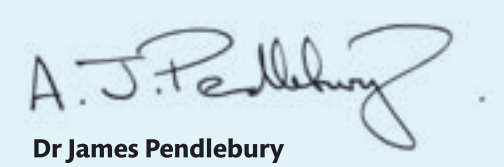
Statement of Total Recognised Gains and Losses for the year ended 31 March 2009

	2008–09 £000	2007–08 £000
Net (deficit) for the year	**(1,822)**	(1,398)
Revaluation (loss)/gain for the year	**(1,279)**	1,206
Total recognised gains/(losses)	**(3,101)**	(192)

The notes on pages 63 to 82 form part of these accounts.

Balance Sheet as at 31 March 2009

	Notes	31 March 2009 £000	31 March 2008 £000
Fixed assets			
Tangible assets	7	**12,275**	14,152
Intangible assets	8	**142**	159
		12,417	14,311
Debtors falling due after more than one year	11	**58**	44
Current assets			
Stocks and Work in Progress	10	**626**	951
Debtors	11	**676**	924
Cash at banks and in hand	12	**454**	275
		1,756	2,150
Creditors – amounts falling due within one year	13	**(1,040)**	(1,185)
Net current assets		**716**	965
Total assets less current liabilities		**13,191**	15,320
Provisions for liabilities and charges	14	**(1,298)**	(103)
		11,893	15,217
Taxpayers' Equity			
General Fund	15	**5,069**	7,086
Revaluation Reserve	16	**6,824**	8,131
		11,893	15,217



Dr James Pendlebury

Chief Executive and Agency Accounting Officer

8 July 2009

The notes on pages 63 to 82 form part of these accounts.

Cash Flow Statement for the year ended 31 March 2009

	Notes	2008–09 £000	2007–08 £000
Net cash inflow from operating activities	17a	**1,118**	463
Capital expenditure	17b	**(268)**	(828)
Net cash surplus/(deficit)		**850**	(365)
Financing – net cash transfer (to)/from Forestry Commission		**(671)**	392
Increase in cash in the period		**179**	27

The notes on pages 63 to 82 form part of these accounts.

Notes to the Accounts

Note 1. Accounting Policies

1.1 Form of Accounts

In accordance with Section 7 of the Government Resources and Accounts Act 2000, the accounts are drawn up in a format agreed and approved by Treasury. They are prepared in accordance with the *Government Financial Reporting Manual* (FReM) issued by HM Treasury for 2008–09 accounts, under the historical cost convention modified by the inclusion of the valuation of assets.

The accounting policies contained in the FReM follow UK Generally Accepted Accounting Practice for companies (UK GAAP) to the extent that it is meaningful and appropriate to the public sector. The particular accounting policies adopted by the Agency are described below. They have been applied consistently in dealing with items considered material in relation to the accounts.

1.2 Tangible Fixed Assets

Where the Agency is the principal beneficial user of assets of the Forestry Commission estate, they are treated as a fixed asset of the Agency although legal ownership is vested in the Forestry Ministers. Staff payroll costs and expenditure on materials and consumables related to systems development software, for general use within the Agency, are recognised as tangible fixed assets. There was no relevant in-house development activity in the year 2008–09.

The normal threshold for the capitalisation of assets is £2,000, but all IT equipment costing £250 or more is capitalised as a pooled asset.

1.3 Valuation of Assets

Professionally qualified staff employed by the Forestry Commission undertake a full revaluation of non-forest land, dwellings and other buildings at five-yearly intervals. They follow the principles set out in the RICS Red Book and value on the basis of Open Market Value, Existing Use Value, Depreciated Replacement Cost or Discounted Cash Flow as appropriate under the RICS guidance. Between full valuations, non-forest land, dwellings and other buildings are restated to current value using appropriate indices provided by the District Valuer. A full valuation took place as at 1 April 2008.

Other tangible and intangible fixed assets are revalued annually using a range of appropriate indices as provided by the Office for National Statistics.

Any surplus on revaluation is credited to the Revaluation Reserve. A deficit on revaluation is debited to the Operating Cost Statement if the deficit exceeds the balance on the Revaluation Reserve.

1.4 Depreciation

Depreciation is provided on all other tangible assets at rates calculated to write off the valuation, less estimated residual value, of each asset evenly over its expected useful life.

Freehold buildings – 20 to 80 years.
Scientific equipment – 5 to 20 years.
IT hardware – 5 years.
Other machinery and equipment – 5 to 20 years.

1.5 Intangible Fixed Assets

Purchases of software with an acquisition value of £2,000 are recognised as intangible fixed assets and amortised over their expected useful lives to a maximum of fifteen years. Software purchases with an acquisition value of less than £2,000 are pooled and treated as intangible fixed assets, as the overall value is material.

1.6 Stocks and Work in Progress

Stocks of publications for resale are held and are valued at the lower of cost and net realisable value. Work in progress on long-term projects is valued at the cost of staff time and other direct costs plus directly attributable overheads based on the normal level of activity.

1.7 Provision for Bad and Doubtful Debts

Specific provision for bad and doubtful debts is set aside on the basis of a review of individual debts at the end of the year.

1.8 Research and Development

As a provider of research services, all income and expenditure on research and development is written off to the Operating Cost Statement.

1.9 Cost of Capital Charges

Charges, representing the cost of capital utilised by the Agency, are identified on the Operating Cost Statement. The charge is calculated at the Government's standard rate of 3.5% in real terms on the average carrying amount of all assets, less liabilities.

1.10 Corporation Tax

Forest Research is not subject to corporation tax.

1.11 Value Added Tax

The Forestry Commission is registered for Value Added Tax (VAT) and accounts for it on a Great Britain basis, including any Agency activity. Income and expenditure shown in the accounts is net of any recoverable VAT. Non-recoverable VAT is charged to the accounts in the year in which it is incurred.

1.12 Foreign Currencies

Transactions in foreign currencies are recorded at the rate ruling at the time of the transaction. Monetary assets and liabilities denominated in foreign currencies at the balance sheet date are translated at the rates ruling at that date. All differences are recorded in the Operating Cost Statement for the period.

1.13 Insurance

In accordance with normal Government accounting practice, the Forestry Commission carries its own insurance risks.

1.14 Pensions

Past and present employees are covered by the provisions of the Principal Civil Service Pension Scheme (PCSPS), which is non-contributory and unfunded. The Forestry Commission recognises the expected cost of providing pensions on a systematic and rational basis over the period during which it accrues benefits from employees' services by payment to the PCSPS of amounts calculated on an accruing basis. Liability for payment of future benefits is a charge on the PCSPS. Further information on pensions is contained in the Remuneration Report and note 4 to the accounts.

1.15 Provisions

Forest Research provides for legal or constructive obligations which are of uncertain timing or amount at the balance sheet date on the basis of the best estimate or the expenditure required to settle the obligation. Where the effect of the time value of money is significant, the estimated risk-adjusted cash flows are discounted using the real rate set by HM Treasury (currently 2.2%).

1.16 Third Party Assets

Forest Research acts as co-ordinator for a number of projects partially funded by the European Commission. The duties of co-ordinators include receiving funds on behalf of partners for onward transmission once work programmes have been approved. These Third Party Assets, which neither the Agency nor government more generally has a direct beneficial interest in, are not recognised in the accounts. The amount held at 31 March 2009 was £Nil.

1.17 Financial assets

Classification

Forest Research classifies its financial assets in the following categories: at fair value through profit or loss, loans and receivables, and available for sale. The classification depends on the purpose for which the financial assets were acquired. Management determines the classification of its financial assets at initial recognition.

(a) Financial assets at fair value through profit or loss
Financial assets at fair value through profit or loss comprise derivatives. Assets in this category are classified as current assets. Forest Research does not trade in derivatives and does not apply hedge accounting.

(b) Loans and receivables
Loans and receivables are non-derivative financial assets with fixed or determinable payments that are not quoted in an active market. They are included in current assets, except for maturities greater than 12 months after the balance sheet date. These are classified as non-current assets. Loans and receivables comprise trade and other receivables and cash and cash equivalents in the Balance sheet.

(c) Available-for-sale financial assets
Available-for-sale financial assets are non-derivatives that are either designated in this category or not classified in any of the other categories. They are included in non-current assets unless management intends to dispose of the investment within 12 months of the balance sheet date. Available for sale financial assets comprise investments.

Recognition and measurement

Financial assets are recognised when Forest Research becomes party to the contractual provisions of the financial instrument.

Financial assets are derecognised when the rights to receive cash flows from the asset have expired or have been transferred and Forest Research has transferred substantially all risks and rewards of ownership.

(a) Financial assets at fair value through profit or loss
Financial assets carried at fair value through profit or loss are initially recognised at fair value, and transaction costs are expensed in the income statement.

Financial assets carried at fair value through profit or loss are subsequently measured at fair value. Gains or losses arising from changes in the fair value are presented in the operating cost statement.

(b) Loans and receivables
Loans and receivables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method, less provision for impairment. A provision for impairment of loans and receivables is established when there is objective evidence that Forest Research will not be able to collect all amounts due according to the original terms of the receivables. Significant financial difficulties of the debtor, probability that the debtor will enter bankruptcy or financial reorganisation, and default or delinquency in payments are considered indicators that the loan and receivable is impaired. The amount of the provision is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the original effective interest rate. The carrying amount of the asset is reduced through the use of an allowance account, and the amount of the loss is recognised in the operating cost statement. When a loan or receivable is uncollectable, it is written off against the allowance account. Subsequent recoveries of amounts previously written off are credited in the operating cost statement.

(c) Available-for-sale financial assets
Available-for-sale financial assets are initially recognised and subsequently carried at fair value. Changes in the fair value of financial assets classified as available for sale are recognised in equity. When financial assets classified as available for sale are sold or impaired, the accumulated fair value adjustments recognised in equity are included in the operating cost statement. Dividends on available-for-sale equity instruments are recognised in the operating cost statement when Forest Research's right to receive payments is established.

The fair values of quoted investments are based on current bid prices. If the market for a financial asset is not active (and for unlisted securities), Forest Research establishes fair value by using valuation techniques. These include the use of recent arm's length transactions, reference to other instruments that are substantially the same, discounted cash flow analysis, and option pricing models, making maximum use of market inputs and relying as little as possible on entity-specific inputs.

Forest Research assesses at each balance sheet date whether there is objective evidence that a financial asset or a group of financial assets is impaired. In the case of equity securities classified as available for sale, a significant or prolonged decline in the fair value of the security below its cost is considered as an indicator that the securities are impaired. If any such evidence exists for available-for-sale financial assets, the cumulative loss – measured as the difference between the acquisition cost and the current fair value, less any impairment loss on that financial asset previously recognised in profit or loss – is removed from equity and recognised in the operating cost statement. Impairment losses recognised in the operating cost statement on equity instruments are not reversed through the income statement.

1.18 Cash and cash equivalents

Cash and cash equivalents include cash in hand, deposits held at call with banks, cash balances held by the Office of the Paymaster General and other short-term highly liquid investments with original maturities of three months or less, and bank overdrafts. Bank overdrafts are shown within borrowings in current liabilities on the Balance sheet.

1.19 Financial Liabilities

Classification

Forest Research classifies its financial liabilities in the following categories: at fair value through profit or loss, and other financial liabilities. The classification depends on the purpose for which the financial liabilities were issued. Management determines the classification of its financial liabilities at initial recognition.

(a) Financial liabilities at fair value through profit or loss
Financial liabilities at fair value through profit or loss comprise derivatives. Liabilities in this category are classified as current liabilities. Forest Research does not trade in derivatives and does not apply hedge accounting.

(b) Other financial liabilities
Other financial liabilities are included in current liabilities, except for maturities greater than 12 months after the balance sheet date. These are classified as non-current liabilities. Forest Research's other financial liabilities comprise trade and other payables in the Balance sheet.

Recognition and measurement

Financial liabilities are recognised when Forest Research becomes party to the contractual provisions of the financial instrument.

A financial liability is removed from the Balance sheet when it is extinguished, that is when the obligation is discharged, cancelled or expired.

(a) Financial liabilities at fair value through profit or loss
Financial liabilities carried at fair value through profit or loss, are initially recognised at fair value, and transaction costs are expensed in the income statement.

Financial liabilities carried at fair value through profit or loss, are subsequently measured at fair value. Gains or losses arising from changes in the fair value are presented in the operating cost statement.

(b) Other financial liabilities
Other financial liabilities are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method.

Note 2. Income from the Forestry Commission

2.1 The Agency undertakes the major proportion of the Forestry Commission's overall annual research programme in the form of specifically commissioned projects to deliver agreed outputs. A separate annual charge is agreed for each project based on full cost recovery. These charges amounted to £10.2 million. Costs established in one year are used to determine project charges for future years. The Agency also provides research and survey services for Forest Enterprise and other parts of the Forestry Commission on a full cost recovery basis.

Income from Forestry Commission customers consisted of:

	2008–09	2007–08
	£000	£000
Research, development and other services to:		
Forestry Commission	**12,075**	11,906
Forest Enterprise	**1,340**	1,186
	13,415	13,092

Note 3. Foreign Exchange Gains

EU income includes £55,000 relating to gains on foreign exchange transactions. Other income includes £30,000 relating to gains on foreign exchange transactions.

Note 4. Staff Costs and Numbers

4.1 Employee costs during the year amounted to:

			2008–09	2007–08
	Permanent staff	**Other staff**	**Total**	
	£000	**£000**	**£000**	£000
Wages and Salaries	**6,646**	**1,081**	**7,727**	7,551
Social Security Costs	**505**	**78**	**583**	573
Employer's Superannuation Costs	**1,317**	**163**	**1,480**	1,426
Agency Staff Costs	**–**	**35**	**35**	35
	8,468	**1,357**	**9,825**	9,585

Average number of employees (full-time equivalents)	**2008–09**	2007–08
Permanent staff	**217**	233
Others	**45**	43
Total staff	**262**	276

Staff were covered by the Principal Civil Service Pension Scheme (PCSPS) which is an unfunded multi-employer defined benefit pension scheme but the Forestry Commission is unable to identify its share of the underlying assets and liabilities. The scheme actuary valued the scheme as at 31 March 2007. Details can be found in the resource accounts of the Cabinet Office: Civil Superannuation (www.civilservice-pensions.gov.uk).

For 2008–09, employers' contributions of £1,480,201 were payable to the PCSPS (2007–08: £1,425,800) at one of four rates in the range 17.1% to 25.5% (2007–08: 17.1% to 25.5%) of pensionable pay, based on salary bands. The scheme actuary reviews employer contributions every four years following a full scheme valuation. The contribution rates reflect benefits accruing during 2008–09 to be paid to the member when they retire and not the benefits paid during this period to existing pensioners.

Employees can opt to open a partnership pension account, a stakeholder pension with an employer contribution. No Agency staff have yet taken this option.

4.2 Benefits in kind are provided under the following schemes:

(i) Advances of Salary for House Purchase
(ii) Advances of Salary for purchase of Season Tickets and Bicycles
(iii) Car Provision for Employees Scheme.

Each scheme is subject to conditions and financial limits.

The Advances of Salary for House Purchase scheme had loans with an outstanding balance of £2,500 or more to three individual members of staff at 31 March 2009. The total outstanding value of all loans was £63,308.

4.3 Early departure costs

In February 2009, Forest Research called for volunteers for early severance on compulsory terms as part of a restructuring programme. The accounts include a provision of £1,220,000 for the early departure costs of those staff committed to leave in the restructuring during 2009–10. The provision represents the present values of the costs due in 2009–10 and beyond. Funding of the cash costs due in 2009–10 of £707,000 will be covered by the Forestry Commission Great Britain.

Note 5. Other Management Costs

Other management costs are stated after charging:

	2008–09	2007–08
	£000	£000
Auditors' remuneration	**28**	25
Travel and subsistence	**566**	558
Staff transfer expenses	**59**	68
Training	**254**	156
Building maintenance	**446**	457
Utilities	**323**	291
Computer supplies	**85**	89
Early retirement/departure costs (excluding exceptional items)	**8**	6
Depreciation of fixed assets	**717**	670
Loss on disposal of fixed assets	**149**	38
Other expenditure	**135**	81
	2,770	2,439

Included within other management costs are charges from the Forestry Commission and Forest Enterprise amounting in total to £191,000 (2007–08: £121,000).

Note 6. Materials and Services

Materials and services are stated after charging:

	2008–09	2007–08
	£000	£000
Materials and supplies	**796**	998
Central services from Forestry Commission	**713**	738
Vehicle lease charges from Forestry Commission	**393**	399
Contractors	**506**	859
Commissioned research	**142**	177
Publications	**22**	38
Protective clothing	**15**	19
Miscellaneous expenditure	**305**	257
	2,892	3,485

Included within materials and services are charges from the Forestry Commission and Forest Enterprise amounting in total to £1,106,000 (2007–08: £1,134,000).

Charges are made to Forest Research from the Forestry Commission and Forest Enterprise, as appropriate, for assistance with field experiments, hire of vehicles, machinery and equipment and for personnel, business management, financial and other support services at Silvan House, Edinburgh.

The decrease in materials and supplies is accounted for by the completion of one project which incurred £149,000 of expenditure in 2007–08 but only £3,000 in 2008–09; in addition there was an £89,000 reduction in expenditure on materials for bio-controls, with some offsetting increases on other projects.

The decrease in contractors' expenditure was as a result of employing fewer contractors to meet contractual commitments and project partners' costs not being treated as Forest Research expenditure.

Note 7. Tangible Fixed Assets

	Freehold Land and Buildings	Scientific Equipment	IT Equipment	Other Machinery and Equipment	Total
	£000	£000	£000	£000	£000
Valuation:					
At 1 April 2008	13,669	2,076	650	784	17,179
Additions	–	112	13	92	217
Transfers	(16)	–	–	–	(16)
Disposals	(116)	(158)	(14)	(9)	(297)
Revaluation to current prices	(1,285)	16	(6)	–	(1,275)
Impairment	–	–	–	(2)	(2)
At 31 March 2009	**12,252**	**2,046**	**643**	**865**	**15,806**
Depreciation:					
At 1 April 2008	**1,518**	**922**	**356**	**231**	**3,027**
Provided in year	280	206	103	69	658
Disposals	(26)	(109)	(13)	(6)	(154)
Revaluation to current prices	–	6	(3)	–	3
Impairment	–	–	–	(3)	(3)
At 31 March 2009	**1,772**	**1,025**	**443**	**291**	**3,531**
Net book value:					
At 31 March 2009	**10,480**	**1,021**	**200**	**574**	**12,275**
At 31 March 2008	12,151	1,154	294	553	14,152

Fixed assets were revalued as at 31 March 2009 in accordance with accounting policies. The valuation includes the principal research stations at Alice Holt Lodge near Farnham in Surrey and the Northern Research Station, Roslin near Edinburgh, with net book values of £7.1 million and £3.2 million, respectively, at 31 March 2009.

Note 8. Intangible Fixed Assets

	2008–09	2007–08
	£000	£000
Valuation		
Balance at 1 April	**279**	252
Additions	**51**	37
Disposals	**(12)**	–
Transfers	**(3)**	–
Revaluation	**(3)**	(10)
As at 31 March	**312**	279
Amortisation		
Opening balance	**120**	69
Depreciation in year	**59**	53
Disposals	**(6)**	–
Transfers	**(2)**	–
Revaluation	**(1)**	(2)
As at 31 March	**170**	120
Net book value	**142**	159

Intangible fixed assets relate wholly to purchased software.

Note 9. Cost of Capital

Notional cost of capital based on 3.5% of average total assets, less current liabilities employed in 2008–09 amounted to £474,335 (2007–08: £510,986).

Note 10. Stocks and Work in Progress

	2008–09	2007–08
	£000	£000
Stocks	**3**	3
Research work in progress	**623**	948
	626	951

Note 11. Debtors

11a. Analysis by type

	2008–09	2007–08
	£000	£000
Amounts falling due within one year		
EU debtors	**145**	295
Other Trade debtors	**279**	438
Other debtors	**5**	7
Prepayments	**247**	184
	676	924
Amounts falling due after one year		
House purchase loans	**58**	44
	734	968

11b. Intra-Government Balances

	2008–09	2007–08
	£000	£000
Balances with other central government bodies	**64**	255
Balances with local authorities	**–**	27
Intra-Government balances	**64**	282
Balances with bodies external to government		
Falling due within one year	**612**	642
Falling due after more than one year	**58**	44
	734	968

Note 12. Cash at bank and in hand

The following balances at 31 March are held at commercial banks and as cash in hand

	2008–09	2007–08
	£000	£000
Opening balance at 1 April	**275**	248
Net change in balances	**179**	27
Balance at 31 March	**454**	275

As part of its normal activities Forest Research maintains Sterling and Euro bank accounts primarily used for the receipt of income from non-Forestry Commission customers. These accounts are cleared to the Commission's main account on a regular basis. Sums held in these accounts on behalf of partners in European Commission projects are treated as third party assets and not included in the balances shown.

Note 13. Creditors: amounts falling due within one year

	2008–09	2007–08
	£000	£000
Payments received on account	**677**	324
Trade creditors	**350**	848
Other creditors including taxation and social security costs	**13**	13
	1,040	1,185

All creditors are bodies external to central or local government. Funds held on behalf of partners in European Commission projects are treated as third party assets and not recorded on the face of the accounts (see note 1.16). At 31 March 2009 the amount held in Forest Research Bank accounts on behalf of partners was £11,544.83 (31 March 2008: Nil).

Note 14. Provisions for Liabilities

	2008–09	2007–08
	£000	£000
Early departure costs		
Balance brought forward	**103**	170
Provided in year	**1,302**	4
Utilised in year	**(34)**	(76)
Unwinding of discount	**(73)**	5
Balance carried forward	**1,298**	103

Note 15. General Fund

	2008–09	2007–08
	£000	£000
Balance brought forward	**7,086**	7,495
Movement in year		
Backlog depreciation	**28**	86
Net (deficit) for year	**(1,822)**	(1,398)
Transfer of fixed assets to (-)/from other Forestry Bodies	**(17)**	–
Cash surplus to (-)/ deficit from Forestry Commission	**(671)**	392
Non-cash inter-country transfers	**(5)**	–
Timing between accrual and cash VAT	**(4)**	–
Notional cost of capital	**474**	511
Balance carried forward	**5,069**	7,086

Note 16. Revaluation Reserve

	2008–09	2007–08
	£000	£000
Balance brought forward	**8,131**	7,011
Revaluation surplus/(deficit) for the year ended 31 March 2009		
Land and Buildings	**(1,285)**	1,212
Scientific equipment	**10**	16
IT	**(3)**	(13)
Other machinery and equipment	**1**	(1)
Intangible assets	**(2)**	(8)
	(1,279)	1,206
Transfer to general fund for backlog depreciation	**(28)**	(86)
Balance carried forward	**6,824**	8,131

Note 17. Note to the Cash Flow Statement

17a. Reconciliation of net deficit to net cash flow from operating activities

	2008–09	2007–08
	£000	£000
Net (deficit) for the year excluding exceptional items	(602)	(1,398)
Early retirement compensation payments on restructuring	(1,220)	–
Adjustments for non-cash transactions		
Depreciation – tangible fixed assets	658	617
Depreciation – intangible fixed assets	59	53
Timing between accrual and cash VAT	(4)	–
Non-cash inter-country transfers	(5)	–
Loss on disposal of buildings	90	–
Loss on disposal of other assets	59	38
Notional cost of capital	474	511
Provisions		
Provided in year	1,302	4
Unwinding of discount	(73)	5
	738	(170)
Adjustments for working capital		
Decrease / (Increase) in stocks and work in progress	325	443
Decrease / (Increase) in debtors	234	(259)
Increase / (Decrease) in creditors	(145)	525
	414	709
Use of provisions	(34)	(76)
Net cash inflow from operations	1,118	463

17b. Analysis of capital expenditure

	2008–09	2007–08
	£000	£000
Tangible fixed assets	361	713
Intangible fixed assets	51	37
Total cash expenditure on fixed assets	412	750
Increase / (Decrease) in creditors	(144)	78
Capital expenditure	268	828

Forest Research restricted capital expenditure for the year to essential items only as a way of minimising a budget deficit, but plans to increase capital expenditure in future years.

Note 18. Post Balance Sheet Events

With effect from 1 April 2009, 11 staff transferred from Forest Research to the Forestry Commission's Inventory Forecasting and Operational Support unit.

During the first quarter of 2009–10 Forest Research intends to jointly launch a spin-out company with the University of Surrey in the area of land remediation; it will have the structure of a Limited Company. The company, C-Cure Solutions Limited, will have initial capital funding of £50,000 from the partners and an estimated value of £80,000. The partners will each own 34.4% of the company and the inventors will own the remaining 33.2%.

These financial statements were authorised for issue on 11 July 2009 by the Agency Accounting Officer.

Note 19. Related Party Transactions

During the year, Forest Research has had a significant number of material transactions with the Forestry Commission, Forest Enterprise country agencies and with the Department for Environment, Food and Rural Affairs, who are regarded as related parties. In addition, Forest Research has had operational transactions with other Government Departments and other central Government bodies.

£4,100 and £3,600 were paid in year on an arm's length basis to the University of Reading and the University of Southampton, respectively, for course fees and production of a database. These transactions are disclosed as Andy Moffat holds a visiting professorship at the University of Reading and Peter Freer-Smith holds a visiting professorship at the University of Southampton.

Note 20. Losses and Special Payments

Forest Research made one special severance payment, with Treasury approval, of £46,000 and a further special payment of £3,000 under appropriate authority. During the year there were no significant losses (2007–08: £nil).

Note 21. Contingent Liabilities

There were two contingent liabilities at 31 March 2009 in respect of actions by ex-employees. One action has since been withdrawn.

Note 22. Financial Instruments

22.1 Financial Instruments by category

	2008–09 Loans and receivables £000	2007–08 Loans and receivables £000
Assets as per balance sheet		
Trade and other receivables (excluding prepayments)	**487**	784
Cash and cash equivalents	**454**	275
Total	**941**	1,059

	2008–09 Other financial liabilities £000	2007–08 Other financial liabilities £000
Liabilities as per balance sheet		
Trade and other payables excluding statutory liabilities (excluding payments received on account)	**363**	861
Total	**363**	861

22.2 Exposure to Risk

Forest Research's activities expose it to a variety of financial risks:

- Credit risk – the possibility that other parties might fail to pay amounts due
- Liquidity risk – the possibility that Forest Research might not have funds available to meet its commitments to make payments

Because of the largely non-trading nature of its activities and the way in which government departments are financed, Forest Research is not exposed to the degree of financial risk faced by business entities.

Credit Risk

Credit risk arises from cash and cash equivalents, deposits with banks and other institutions, as well as credit exposures to customers, including outstanding receivables and committed transactions.

Forest Research does not generally allow credit for customers such that £243,000 of the £487,000 balance is past its due date for payment. £145,000 of the £243,000 relates to EU debts, which will be received in due course. The past due amount at 31 March 2009 can be analysed by age as follows:

	£000
Less than one month	**48**
One to two months	**13**
More than two months	**182**
Total	**243**

Liquidity risk

Each financial year, the Forestry Commission makes provision for the use of resources by Forest Research for revenue and capital purposes. Each financial year, the Westminster Parliament makes provision for the use of resources by the Forestry Commission for revenue and capital purposes in the Consolidated Fund Act via the Department for Environment, Food and Rural Affairs (Defra) vote. Resources and accruing resources may be used only for the purposes specified and up to the amounts specified in the Consolidated Fund Act. The Act also specifies an overall cash authorisation to operate for the financial year. Forest Research is not therefore exposed to significant liquidity risks.

The table below analyses the financial liabilities into relevant maturity groupings based on the remaining period at the balance sheet to contractual maturity date. The amounts disclosed in the table are the contractual undiscounted cash flows. Balances due within 12 months equal their carrying balances as the impact of discounting is not significant.

	2008–09		2007–08	
	Less than 1 year	**More than 1 year**	Less than 1 year	More than 1 year
	£000	**£000**	£000	£000
Trade and other payables excluding statutory liabilities (excluding payments received on account)	**363**	**–**	861	–
	363	**–**	861	–

Market Risk

The Agency has no powers to borrow or invest surplus funds. Financial assets and liabilities are generated by day-to-day operational activities and are not held to manage the risks facing the department in undertaking its activities.

i) Cash flow and fair value interest rate risk

Forest Research has no significant interest-bearing assets or liabilities and as such income and expenditure cashflows are substantially independent of changes in market interest rates.

ii) Foreign Currency Risk

Forest Research's only exposures to foreign exchange rates are through a bank account denominated in Euros and through receipt of EU funding for contracts which are denominated in Euros.

EU contract income denominated in Euros forms only 3% of Forest Research's total income. Therefore fluctuations in exchange rates do not have a significant impact on Forest Research's financial position.

22.3 Capital risk management

The Agency has no powers to borrow or invest surplus funds.

22.4 Fair value estimation

The carrying value less impairment provision of trade receivables and payables are assumed to approximate their fair value.

Note 23. Financial Performance Measures

The Agency's net deficit was £1,822,000. Financial performance from normal operating activity resulted in an operating deficit of £128,000, which, after allowing for the cost of capital, and before exceptional items, represented a cost recovery of 96.2% (2007–08: 91.3%).

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